THE MICRO USER

THE MICRO USER

THE BIGGEST, MOST READ MAGAZINE FOR ACORN MICRO USERS

Volume 9 Number 9 November 1991 £1.95

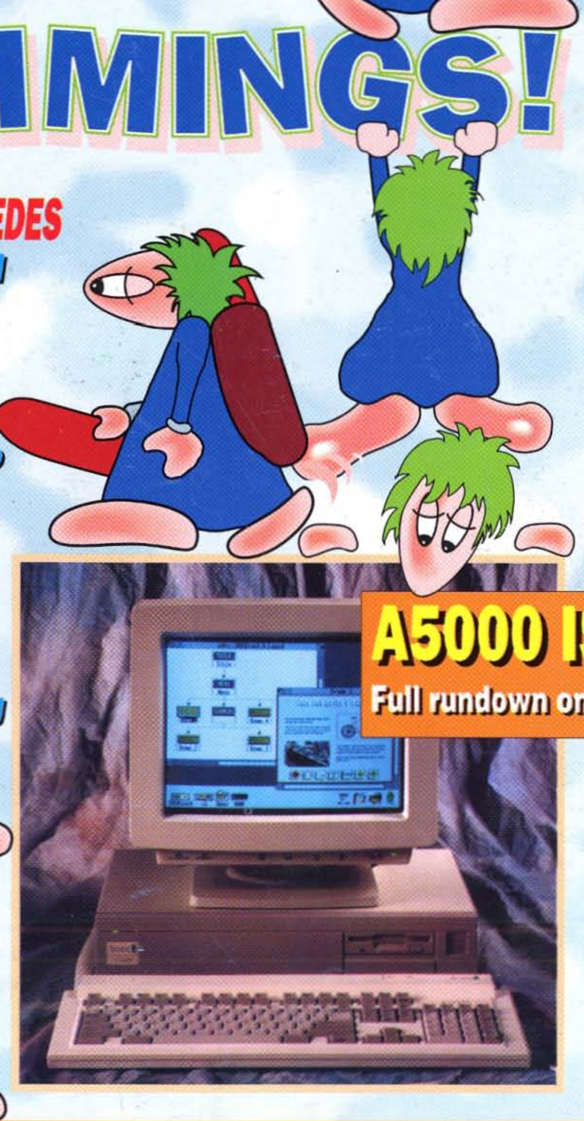
LEMMINGS!

ESSENTIAL ARCHIMEDES
Hands-on tutorial for new users

PLAY JIGSAW
Frustrating fun on the BBC Micro

FREEBIES
More software at no cost

LET'S COMPUTE!
Fun programming for beginners



A5000 IS HERE!
Full rundown on Acorn's latest

November

Vol. 9 No. 9

11>

9 770265 404028

For ALL users of the BBC Micro, Master, Archimedes series, A3000, Electron

MORLEY E·L·E·C·T·

Archimedes

THE WORLDS MOST POWERFUL MICRO

A3000	£599
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As Supplied to Acorn for their A3000 Special Access Package

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SCSI HARD DISK DRIVES

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R·O·N·I·C·S · L·T·D

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Site Licence	£200

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AnDi ODDULE	£49
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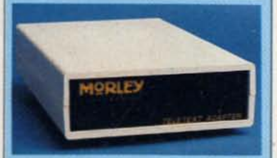
The Alfred Robot Arm is designed to provide a low cost solution to the teaching of the principles of robotics in schools, colleges and industrial training departments.

The system is structured to provide on-going education by introducing expansion modules, therefore always updating the system to meet mew technology demands.

The complexity of exercises that can be carried out will benefit school children who are being introduced to robot technology or technical college students requiring an in-depth understanding of industrial robots. **£330**

TELETEXT



THE MORLEY TELETEXT ADAPTER

BBC/Master	£104
Compact	£120
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Archimedes	£125
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Upgrade from BBC to Archimedes	£35

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Totally software controlled.

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Allows drive numbers to be changed from software **£48**

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No more need to switch your computer off to insert a cartridge containing a required ROM.

With 2 cartridges and a ROM board, a staggering 32 ROM images installed.

Allows an additional 8x16k and 4x32k ROMs to be installed in the Master and still leaves the cartridge slots free.

Master control ROM which includes a clever file transfer program allowing files to be transferred between DFS and ADFS formats or vice-versa. £49

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THE MICRO USER

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January-June 1991

The Micro User welcomes new program listings and articles for publication. All material should be supplied on disc or tape and printed. Please enclose a stamped, self-addressed envelope, otherwise the return of material cannot be guaranteed. Contributions accepted for publication will be on an all-rights basis.

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COVER STORY

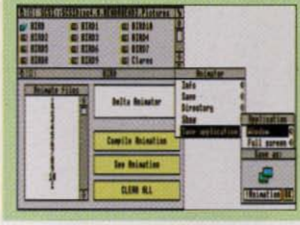
THE ACORN A5000

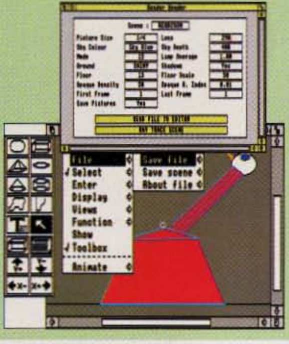
The new machine is here! Find out what it's in it and how Acorn have produced another miracle of computer technology at a very reasonable price. Page 112.

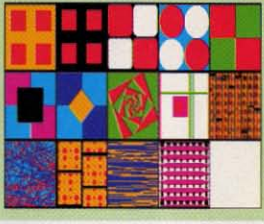
SPECIALS

71 **Partition** *
Beat the 31 files per disc limit on the DFS with this unique – and totally legal utility

107 **Render Bender II**
Ray-tracing made easy? We take a thorough look at this new suite of programs







Type-it-in

This symbol indicates that the * **feature contains at least one full length listing for you to key in on your micro.**

Get it right ✓

All the major listings in this magazine are accompanied by checksums to help you key them in correctly.

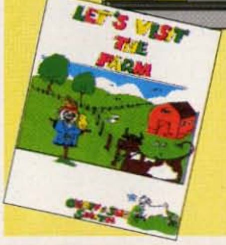
For full details of how to use them see the article on page 56 of the February 1991 issue.

EDUCATION

27 **Update**
Up-to-the-minute news of the Acorn range of micros in use in the world of education.

30 **Reviews**
Catch up on the latest software for the BBC Micro series in schools, including:

- Shylock Gnomes
- Sellardore Tales
- superMarket



You are in the mirror room

REGULARS: News 11 ● Hac Man 20 ● PD

Essential Archimedes

Make your learning curve even easier with our four how-to-do-it series for all Archimedes users.

60 **DTP** Learn the fundamentals of page layout and design.

62 **Databases** Discover how to handle information technology.

64 **Spreadsheets** Explore cells and functions to manipulate numbers.

66 **Object drawing** Find out how to create pictures that can easily be altered.

LET'S COMPUTE!

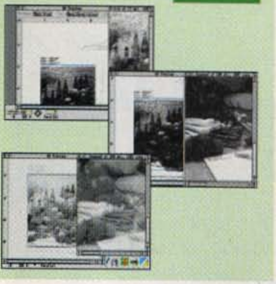
Continuing our fun section that teaches the basics of computer programming.

59 **Rom & Ram** Learn about programming in BBC Basic. *

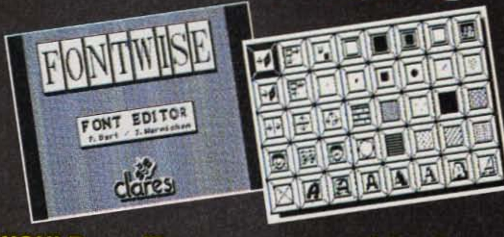
63 **Logo Lowdown** Discover how to make the turtles do what you want. *

68 **Safe Scientist** The Mad Professor introduces you to genetics. *

Now in colour Two colour scanner packages that use the same hardware are given a test drive. * **117**



FREEBIES



WOULD you like some commercial software for the 8 bit BBC Micro for free? Find out how you can get it on Page 18.

THE MICRO USER

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You have the choice of extra issues for free, an amazing flight simulator or brilliant quiz game.

And that's not all, for month after month with your subscription you'll receive a disc or tape with software and listings from the latest issue.

In addition, those readers with a BBC A3000 or Archimedes series machine will also get extra programs. This month they will receive:

- Virus Killer, version 2.30
- Plus tons of PD software

Find out how to subscribe on Page 132

ELITE
HEAVEN →
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LEMMINGS!

Software SCENE **46**

Our experts sift through the latest games releases.

NEXT MONTH IN THE MICRO USER

There are lots of handy utilities for all Acorn machines and our PD section full of great money-saving ideas. Plus, on next month's subscription disc, a great playable demo of the hilariously funny Chuck Rock by Krisalis.

Page 39 • Problem Solved 43 • Body Building 57 • Letters 103

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We can match or improve on prices advertised or quoted in or from this magazine please phone for the best deals.

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* Pack includes PC Emulator, 1st Word Plus, Genesis. ** + Acorn DTP.

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Colour System	**£1289**
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^ comes with free VIDC enhancer.

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Master 128	**£369**

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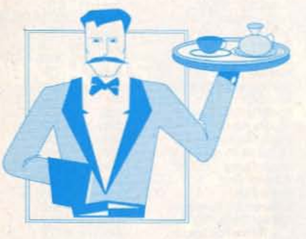

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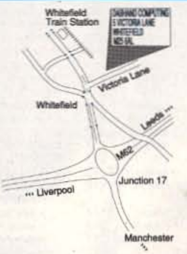

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NEWS BEAT

Drawing package challenge to the PC

COMPUTER Concepts (0442 63933) have announced a new graphics drawing and illustration program which they claim will allow the Archimedes to draw complex illustrations faster than a 486 PC or MaxFX.

Likened to powerful drawing programs such as CorelDraw, Illustrator and Freehand, it will be called ArtWorks and should be out by the end of the year.

Features will include fast on-screen graduated shading, colour dithering, background redraw, infinite undo and redo of all edit operations, editable rotated text and text round curves. The price has yet to be fixed.

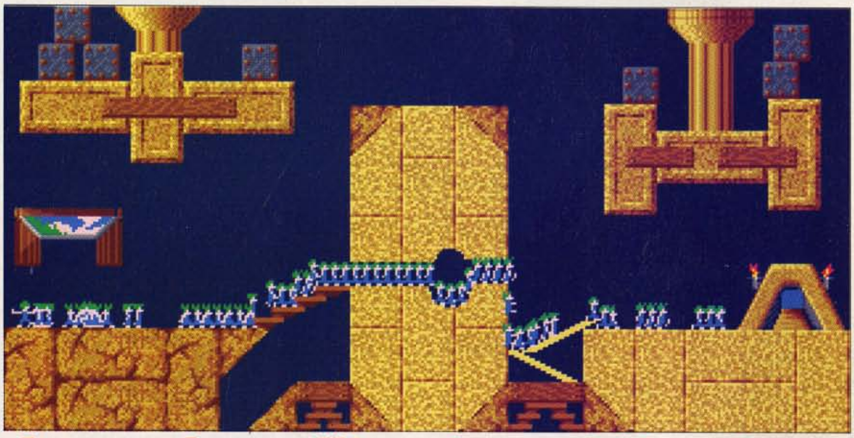
Computer Concepts are also claiming to be the first to break the £1,000 price barrier for 600dpi printers with a new addition to the LaserDirect range. With expansion board and software, the HiRes4 costs £999 plus VAT.

"The closest equivalent on any machine that we are aware of retails for over three times this price", said Charles Moir of Computer Concepts.

The complete system includes LBP4 printer with video interface and expansion board; latest LaserDirect software with Epson emulation and 128 grey-level printing; faster printer drivers offering background printing, page compression and page queueing; Econet and Nexus network compatible options; PC compatibility plus 300 and 600 dpi resolutions.

A further new launch is Compression, a low-cost file compression utility which can achieve an average of two or three to one compression using LZW.

"Unlike other compression utilities, this appears on the desktop as a completely standard filing system so that it operates with all applications directly", said Moir. Compression costs £49 plus VAT.



Lemmings file aboard the Arc

ARCHIMEDES owners are about to join the Lemmings success story courtesy of Krisalis (0709 372290). Already hit of the year for Psygnosis, Lemmings for the Archimedes costs £25.99 and according to Krisalis boss Tony Kavanagh is exactly the same as the Amiga version.

"We approached Psygnosis and eventually we all agreed that it would be more appropriate if we were to publish the Archimedes version for a market where we have a reasonable presence and a lot of confidence", said Kavanagh. "The leisure market for the Archimedes is still growing but I think that the arrival of Lemmings will give it an injection of, shall we say, street cred".

Krisalis are also to release an Arc version of their own chart topper, Manchester United Europe.

Canon fires image capture systems

ARCHIMEDES and A3000 owners can now drop real photographs into their DTP work with the minimum of fuss. The new Spritemaster imaging systems from Cambridgeshire Software House (0480 67945) are designed to give them high quality Sprites from photographic equipment.

Colourmaster includes a Canon Ion still video camera, an attachment to convert 35mm slides into digitised images, the techno-I colour digitiser and necessary cables for £850.

Monomaster teams the Canon camera with the new Zeridajh monochrome digitiser and Translator digitising software. Also available is a range of Risc OS multitasking software which allows users to alter TIF, GIF and many other image types into sprites. Price: £675.The Zeridajh monochrome digitiser offers high quality print in 256 levels of grey and costs £225.

DTSoftware (0223 841099) are about to launch a new Archimedes/A3000 image capture system based around the Canon Ion camera.

Allowing pictures to be transferred directly into the computer for DTP work and school projects, the system includes camera, colour video digitiser and camera control link for £699 plus VAT.

It supports Sprite, Clear, TIFF and GIF files for output, can capture both mono and colour images and features a thumbnail mode for preview of stored images. All software is fully Risc OS compliant.

IMAGES IN STORE

A FRAMESTORE with image analysis software has been launched for the Acorn R260 workstation by Foster Findlay (091-273 1111). The company's established C Images image analysis library has been ported to the R260 and an R260 version of the Wild Vision Hawk V12 framestore developed. They combine into a system that will capture images from video and process them with the full power of the Acorn workstation under UNIX. Price, £2,600 plus VAT.

New from RISC Developments (BEEBUG's R&D operation)

DeskEdit

An advanced all-purpose multi-tasking Text Editor for the Archimedes, with special features tailored for use with plain text, Basic and C source.

General editing features

Three special Find and Replace modes - from Simple to Power Search
Additional Quick-Search mode for rapid retrieval
Text macros to insert user strings in both text and source code
Special Undelete buffer for moving text around, in addition to Edit-style Undo/Redo
Dedicated markers and position finders for finding your way around large files.
Clipboard, providing an alternative way to move text around

Plus

On screen Help - full documentation in a scrollable window
Instant file info feature, and current directory setter
Caret flash controller for DeskEdit and other applications
Customised user commands to open directories, run other applications and launch Obey files
Numerous keyboard shortcuts including date and filename insertion, changing case, moving windows to the front or back of the stack, parking the mouse pointer, inserting printer codes etc.

Printout

Fast text printout including style codes for bold, underline, italics, page breaks etc.
Special text printing options with headers, footers, page numbering and style codes.
Useful Preview mode.
A Statistics option with a summary of aspects of the text to be printed.

Language specific features:

DeskEdit will format word-wrapped **plain text** as you type.
Basic files will automatically be detokenised, when you drag them to the icon, and loaded into DeskEdit ready for editing. F3 will retokenise and save them after editing.
Function and Procedure browser.
Automatic line number insertion.
Special **C language** features.
Auto indent facility combined with automatic generation of opening braces streamlines source code entry.
C function browser and synthax checker

Other Archimedes Products from RISC Developments

A selection of 12 multi-tasking

Desktop Applications

- **DataSheet** - data presentation package for creating annotated graphs.
- **Calc_570** - an implementation of a scientific calculator.
- **CharDes** - character designer for creating new system fonts.
- **Diary** - a Desktop diary and calendar.
- **B_to_T** allows Basic programs to be edited without leaving the Desktop.
- **FileFind** performs a hierarchical search for a given file, application or directory.
- **SetType** - change the filetype of any file by dragging it to the icon bar.
- **HotKeys** - allows single key presses to perform a wide range of functions.
- **Mouse** - change the mouse speed merely by clicking on an icon.
- **Print** allows files to be printed just by dragging them to the icon bar.
- **NotePad** for up to eight pages of jottings.
- **Dustbin** - sits on the icon bar and allows files to be deleted by simply dragging them to its icon.

ArcOmnibus

7 Original Archimedes Games

- **Amaze** - a graphically superb sliding block game with a difference.
- **Cribbage** - an excellent implementation of the well known card game.
- **Moric** - a colourful 'ladders and levels' game.
- **Ogre's Lair** - a highly entertaining arcade type game, providing hours of fun.
- **Pick a Pair** - a colourful game testing your skills of observation and memory.
- **BalloonMan** - burst the balloon - a Pacman style of game.
- **Dominoes** - a Desktop version of the classic

RISC developments Ltd

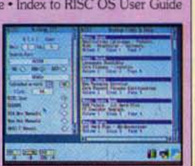
An all-purpose reference finder for books, magazines and manuals

ArcScan III

Contains the following Databases:

- RISC User Volumes 1 - 4 • BEEBUG Volumes 1 - 9
- Index to RISC OS Programmer's Reference Manual
- Index to ANSI C Manual (Release 3)
- Index to BBC Basic Guide • Index to RISC OS User Guide

ArcScan III features:



- flexible keyboard search on any entry
- dynamic memory management
- improved search logic - choice of 3 logical operators: OR, AND and NOT
- dedicated ARM code routines enabling rapid information retrieval
- fast scrolling Wimp window displaying finds
- detailed manual and extensive on-screen help
- new extended wildcard option
- fully user customisable

ArcScan Library Disc

Offers an index for Acorn User and Micro User magazines from January 1987 to date.
The Library Disc will be regularly updated to include the latest issues, and upgrades will be available for £4.45. As a **Special Offer** you can purchase an ArcScan Library disc with vouchers for two upgrades for the price of £16.95.

File Handling for All

by David Spencer and Mike Williams

File Handling for All is a comprehensive book which covers all the requirements of data storage and processing by computer, using the popular BBC Basic programming language for the examples. It is aimed at anybody interested in File Handling and Databases, whether beginners or more advanced users, and will appeal to all who want to learn more of this important subject.

The book starts with an introduction to the rudiments of file handling, and in the following chapters develops an in-depth look at the different types of files e.g. serial files, indexed files, direct access files, and searching and sorting. A separate chapter is devoted to hierarchical and relational database design, and the book concludes with practical advice on developing file handling programs.

The associated disc (£4.75) contains complete working programs based on the routines described in the book and a copy of Filer, a full-feature Database program.

Wimp Programmer's Toolkit

Twelve powerful multi-tasking utilities - an essential aid to any programmer

- **Wimp Debugger** - debug Wimp-based programs while testing and running them.
- **Spyglass** - displays the contents of memory allocated to any task currently running.
- **Template Editor** - Acorn's FormEd for designing windows.
- **Template File Browser** - view the contents of a template file.
- **Application Shell Generator** utility for creating application directories, Obey files and their sprites.
- **Menu Editor** for creating and editing Wimp menu structures.
- **WimpAid** allows pointer, window and icon parameters to be dynamically displayed on screen.
- **Iconbar Shell Generator** - create simple multi-tasking programs
- **Desktop File Loader** allows you to load a program from the Desktop, rather than run it.
- **Icon Flag Generator** calculates the value of icon flags.
- **Wimp Message Monitor** - monitors the Wimp polling system.
- **EasyWimp** provides a ready-made Wimp application shell to be used for creation of single-window applications.

Order form

DeskEdit	**£24.95**	Stock Code **PEDTa**	☐
Wimp Programmer's Toolkit	**£19.95**	Stock Code **PWPTa**	☐
Arcscan III	**£18.95**	Stock Code **PAS3a**	☐
Arcscan Library Disc	**£ 9.95**	Stock Code **PAL1a**	☐
Desktop Applications	**£14.90**	Stock Code **PDA1a**	☐
ArcOmnibus Games	**£14.90**	Stock Code **PAOMa**	☐
File Handling for All	**£ 9.95**	Stock Code **BKO2b**	☐
Disc supporting the book	**£ 4.75**	Stock Code **BKO3a**	☐

*Please add p&p: **a:** £1-UK, £2- Europe and £2.60 elsewhere;*
***b:** £2-UK, £3-Europe and £5.50 elsewhere*

I enclose a cheque for £________
(all cheques must be in pounds sterling, drawn on a UK bank)
or, please debit my Access/Visa account No.

Card Expiry Date ____/____ Signature ________

Name ________

Address ________

MN ________ Post Code ________

117 Hatfield Road, St. Albans, Herts AL1 4JS Tel. (0727) 40303 Fax. (0727) 860263

All aboard for high technology

SECRETARY of State for Agriculture John Gummer visited Lindis International recently to officially launch their new venture – the Lindis Technology Bus.

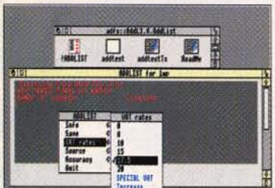
The classic double-decker has been fitted out with Acorn computers and PCs and will be travelling around schools and colleges in Norfolk and Suffolk to demonstrate Lindis products and provide training facilities.

It will also visit user groups, exhibitions and business premises.

At the launch, children from local schools were invited to try out the computers and various software houses demonstrated their packages.

Lindis (0986 85476) are soon to release version 1.0 of their schematic design program CadMust-Schematic. Fully Risc OS multitasking, it will run on a 1Mb Archimedes or A3000 and features many enhancements not in the current version 0.98. It will cost £539 plus VAT.

Agricultural Minister John Gummer tries his hand at an Archimedes on the bus



Keep that Vatman happy

WHEN the VAT man commeth, it's reassuring to know that your figures are as correct as they can be. Now, Archimedes owners can use their machines to keep the Inland Revenue happy.

RTP Technology (0902 756065) have launched Addlist, a multitasking application which performs invoice maths on files prepared by First Word Plus. It will correctly calculate VAT columns and VAT inclusive prices to selectable levels of accuracy, either two or three decimal places rounded and also accumulaates column totals. Price :£14.98.

Thank your Electron for that hangover!

WHEN young Geordies wanting to show off their drinking prowess fall foul of connoisseurs' brews like Old Genie and Blackout, they can thank an Acorn Electron for their hangovers.

Special brews of this strength and quality rely heavily on the beer being kept at exactly the right temperature to activate the yeast. In the unlikely setting of the renowned Big Lamp Brewery of Newcastle Upon Tyne, that job has been reliably carried out for many years by a faithful Electron.

In a three floor building, the brewery runs on a gravity fed system with raw materials going in at the top and beer coming out at the bottom. The Electron is situated on the first floor where it is programmed to keep the temperature of the fermenting beer at a steady 72 degrees Fahrenheit.

To do this it is connected via washing machine valves to hoses which surround the fermenting tanks and governs whether water circulating around the tanks is hot or cold.

The Electron was discovered by Micro User reader Peter Rayner of Prudhoe, Northumberland, who was visiting the brewery on a trip connected to his A Level Physics course.

"The Electron can simultaneously contol up to four tanks of fermenting beer", he said. "It was also connected to an ancient black and white television. A Plus 1 interface was also found in this unusual situation and a cable was connected from a user port in one of its cartridge sockets to a wooden box which I believe held the switching circuitry.

"The program was devised by someone closely associated with the brewery. It appeared to be quite advanced and fully menu driven and I was told that the computer had even survived a deluge of water that once poured down from the floor above.

"As an Electron owner myself, I was amazed by the Big Lamp's use of the computer and challenge anyone to find a more unusual job for an Electron or for that matter, any other Acorn machine!"

And Gordon Storey who took over the Big Lamp two years ago with his partner Lee Golding could shed no further light on how the Electron had been recruited into brewing.

"The brewery has been going since 1982 and the Electron cooling system was already in place when we took it over", he told The Micro User. "All I know is that it is very efficient and runs for long hours without giving us any trouble".

IMAGES IN STORE

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The company's established C Images image analysis library has been ported to the R260 and an R260 version of the Wild Vision Hawk V12 framestore has been developed. They combine into a system that will capture images from video and process them with the full power of the Acorn workstation under UNIX.

C Images is a library of more than 250 image processing analysis routines in C. The system costs £2,600 plus VAT.

IDE Hard Disc Upgrades
for the Archimedes & A3000

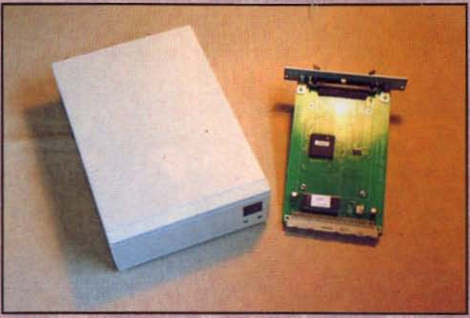
A revolution in hard disc expansion

What is IDE?

IDE (Integrated Drive Electronics) is the latest interface standard for connecting hard disc drives to personal computers. Unlike previous interfaces it incorporates much of the circuitry on to the drive itself, greatly simplifying the interface electronics.

How fast is IDE?

The IDE interface uses a full sixteen bit data bus that allows very high transfer rates between the drive and computer. This coupled with cache memory on the drive itself provides for an Archimedes hard disc system that is typically 50% faster than the standard Acorn ST506 hard disc interface.



What drive options are available?

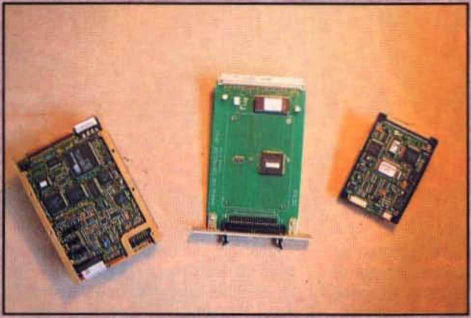
Archimedes 310, 440, 400/1 and 540.

Drive sizes currently available are 42, 89 and 105 Mbyte with a typical access time of 28ms for the 42Mb models and less than 20ms for the others.

These 3.5" drives are available as either internal or external units, and use our high speed 16 bit IDE interface card that fits in your podule backplane. External drives are attractively boxed with their own internal power supply and fan. You may even use both an internal and external drive from the same interface if required.

A3000

The external drives above are also suitable for the A3000, used in conjunction with the 16 bit interface card that fits in the A3000 podule slot. We are also able to offer internal IDE drives for the A3000 that fit into the internal podule slot. These special 2.5" dirves are available in 20 and 42 Mbyte formats and have access times of 23ms.



Will my existing software work with IDE?

The careful design of RISC OS and IDEFS, our IDE filing system, ensures that all RISC OS compliant software will function perfectly with IDE drives. Some older software may need minor changes, but these are documented in the user guide. There are no hidden catches!

Can I add additional drives at a later date?

The IDE interface can support two hard disc drives. Typically, one of these would be fitted internally, and the second unit connected externally via the expansion connector provided on each interface card.

What does the future hold?

IDE is a relatively new interface standard, but has already gained massive support. The next few months will see drives up to 400Mbyte, with larger capacities, and devices such as tape-streamers following very soon. The future for IDE is very bright indeed.

Quality

You may have total confidence in our products. Only the best drives from recognised manufacturers are used, Conner, Seagate, NEC etc. All drive kits are supplied with full fitting instructions and a user guide to ensure that you will have no problems at all. Our interface conforms fully with Acorn's IDEFS specification.

	Internal		*External*	
Description	***Stock Code***	***Price***	***Stock Code***	***Price***
Archimedes 42 Mb	*5251*	*£269.00*	*5261*	*£359.00*
Archimedes 89 Mb	*5252*	*£389.00*	*5262*	*£479.00*
Archimedes 105 Mb	*5253*	*£499.00*	*5263*	*£589.00*
A3000 20 Mb	*5270*	*£375.00*	*N/A*	------
A3000 42 Mb	*5271*	*£569.00*	*5281*	*£369.00*
A3000 89 Mb	*N/A*	------	*5282*	*£489.00*
A3000 105 Mb	*N/A*	------	*5283*	*£599.00*

All prices include IDE High Speed Interface.

All prices are Ex VAT

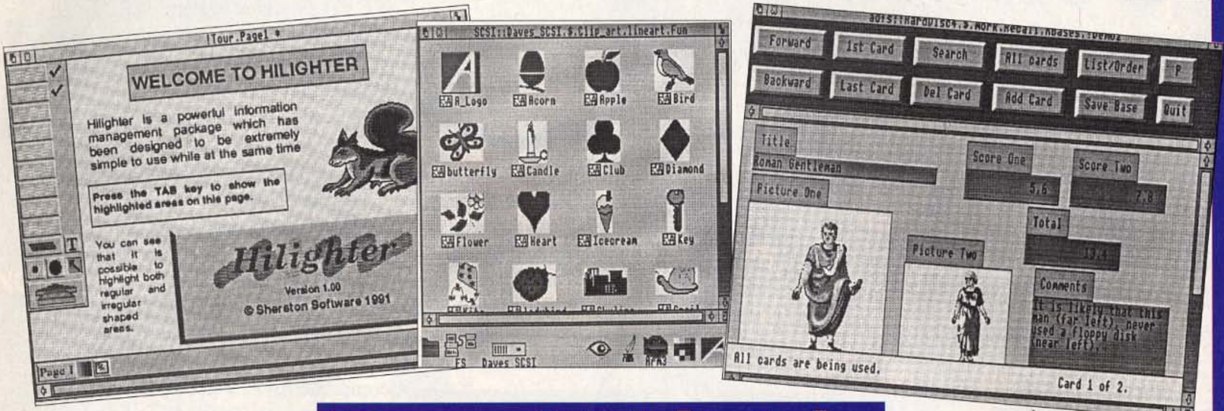
Available from your local dealer, or directly from Beebug (please add £9 carriage).

BEEBUG

Please write or phone for our New A4, 72 page full colour Product Guide.

117 Hatfield Road, St. Albans, Hertfordshire AL1 4JS
Tel. 0727 40303, Fax. 0727 860263

This advertisement was produced entirely with Ovation DTP from BEEBUG



Hilighter is a powerful information management package which has been designed to be extremely simple to use while at the same time

Press the TAB key to show the highlighted areas on this page.

You can see that it is possible to highlight both regular and irregular shaped areas.

Title: Roman Gentleman

Picture One

Picture Two

Score One: 5.6

Score Two: 7.8

Total: 13.4

Comments: It is likely that this man (far left), never used a floppy disk (near left).

All cards are being used.

Card 1 of 2.

New 32-bit trio from Sherston

THREE new Archimedes and A3000 titles have been announced by Sherston Software (0666 840433).

!HiLighter is an information handling package which allows both children and adults to link pages of graphics and text together.

It comes with several different !HiLighter folders to illustrate its potential. Sherston claim it has a multitude of possible uses both in school and at home.

!Recall is Sherston's new database which has been specially designed for children to use. Features include easy-to-design record sheets which will handle !Draw and sprite files, pictorial representation of searches, sum fields that allow the package to be used like a mini spreadsheet and full graphing facilities.

!Glimpse is a utility to be used alongside any DTP or design work. It simply displays miniature versions of all !Draw and sprite files within its own window so users can browse through and pick the one most suitable to their application. It also allows viewing of multiple sprites within a sprite file and double clicking on the miniature version displayed will load it straight into !Paint or !Draw.

Prices have yet to be finalised but !HiLighter and !Recall are likely to be under £50 and !Glimpse less than £10.

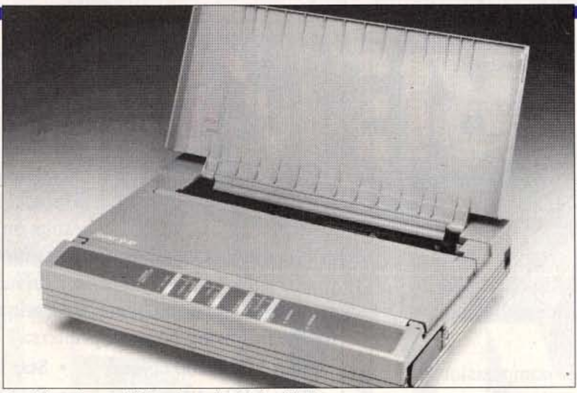
Star put on a big show

STAR Micronics (0494 471111) chose the Business Computing '91 exhibition for the first public showing of their new range of 9 and 24 pin printers.

The Pro-to-Col series replaces Star's existing Professional series. Four machines make up the range and feature improved paper handling, low operational noise and built-in colour capacity.

For 9 pin customers there are the ZA-200 at £399 and the wide carriage ZA-250 at £499. They offer 420 cps in high speed draft, a draft elite speed of 336 and an nlq speed of 84 cps.

On the 24 pin front are the XB24-200 (£499) and the XB24-250 (£599) which provide high speed draft of 332 cps, draft elite at 300 cps and 100 cps in nlq.


Stsr Micronics new ink jet printer, the Starjet SJ-48

Also new from Star is the StarJet SJ-48, a portable ink jet printer which uses non-impact ink jet technology to produce laser quality print. It offers a print speed of 100 cps in both high quality and economy modes and costs £345.

And rounding off the company's new machines is the LC-20, its 9 pin entry level Business series dot matrix.

Aimed at small businesses, home use and education it offers 180 cps in draft elite, 45 cps in nlq and costs £259. All prices are exclusive of VAT.

Safety briefings

A NEW European directive on the health and safety aspects of working with VDUs comes into force on January 1 next year. This will place the onus on employers to ensure that their equipment conforms to certain safety standards and it also has implications for the designers and suppliers of computer screens.

Since many people are unsure of what is required, HUSAT – Human Sciences and Advanced Technology Training – is running a series of one-day briefings.

Leading experts giving presentations will include Brian Pearce of HUSAT and Dr. Colin Mackay of the Health and Safety Executive. Further detai from Margaret Judson or Sarah Cotton at HUSAT on 0509 611088.

Making IT pay

COMPANIES investing in IT are not necessarily exploiting new systems to their full potential. That is one finding in a major report on the future of IT just published by McGraw-Hill in association with Anderson Consulting and The Sunday Times.

Called Trends in Information Technology, the paperback costs £12.95 and puts forward the view that this under use and lack of business integration could result in lower profits for many companies and suggests remedies.

ovation

Professional Desktop Publisher

Ovation sets new standards of quality and value by offering professional features in an easy-to-use package at a very competitive price. We guarantee that you will be able to produce high quality documents within hours of opening the package. Ovation provides a formidable array of desktop publishing features, yet can be used just like a traditional word processor to produce single page letters or entire books with complete ease.

Price ***£99.00*** Exc. VAT

Features include:

- *multitasking/multi-documents*
- *full WYSIWYG display*
- *fast spelling checker (needs 2Mb)*
- *variable views • headers/footers*
- *font size 1-1000pt • master pages*
- *import draw & sprite files*
- *full colour support • linked frames*
- *multiple columns • stylesheets*
- *definable frame borders*
- *auto hyphenation (needs 2Mb)*
- *find & replace • line drawing*
- *cut, copy, paste via clipboard*
- *dot-matrix & laser printer drivers*

Please write or phone for a full specification.

The package includes a 250 page user guide for novices and experienced users, a quick reference card, 7 outline fonts, and a range of clipart.

C Development System for the Archimedes & A3000

The C development system is a **complete C language** at an incredible price. It is ideal for beginners, but may be used by experienced C programmers to develop large applications.

The package includes a **multi-tasking editor** from which programs may be compiled and executed without leaving the desktop. In fact you can compile, link and run C programs at the press of a key.

The **compiler** is quick, easy-to-use and generates ARM code which may be linked to other programs using the **linker**. Compiler errors are automatically highlighted in the editor for easy correction.

The package includes a 200 page user guide, editor, compiler, linker and library of functions. Requires 1MB RAM and single floppy drive only.

A comprehensive range of Acorn compatible **RISC OS functions** is included, allowing complete WIMP applications to be written. New libraries of functions may be created, or functions added to the existing libraries using the built-in **library manager**.

Price ***£77.39*** Exc. VAT

Hard Disc Companion

This is a reliable and easy-to-use hard disc archiver, which effortlessly backs up your hard disc (either all of it or just the latest changes) onto floppy discs. In the event of a hard disc failure you can confidently recover all your files. You can also restore individual files from the backup at any time - useful if you accidentally delete a file. Other features include:

- Full & incremental backups
- Automatic reminder
- Individual file restore
- Ignore files/directories
- File compression
- Full restore
- Verify whilst archiving
- 'Spark' file archiver

Price ***£33.91*** Exc. VAT

Star Colour Printer Driver

This RISC OS printer driver was developed in conjunction with Star Micronics for their excellent range of colour printers.. It gives superb results on both 9 and 24-pin printers, and is ideal for all applications that use RISC OS printer drivers. It is a Release 2 driver, supporting various print resolutions and 'fancy' text printing, and is suitable for the following range of printers:

- Star LC24-200 colour
- Star XB24-10 colour
- Epson JX compatible
- Star LC-200 colour
- Star LC-10 colour
- Epson LQ & SQ colour

Price ***£15.00*** Exc. VAT.

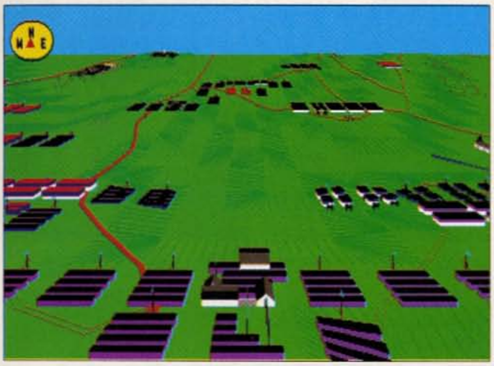
The official Star Micronics printer driver.

Quality software for the Archimedes and A3000

RISC developments

These products are available from all good dealers

RISC Developments Ltd. 117 Hatfield Road, St. Albans, Herts. AL1 4JS Tel: 0727 40303 Fax: 0727 860263



The Archimedes meets its Waterloo

WATERLOO, the highly acclaimed simulation of Napoleon's last battle, is now available for the Archimedes and promises to be even more realistic than other formats which are reputed to have sold in excess of 30,000 copies.

It has been designed and written by Peter Turcan whose other successes include Borodino, Austerlitz and Gettysburg simulations and the original Scrabble program.

"The new Archimedes version includes all the unique features of the previous versions, notably the 3D perspective graphical view of the battlefield and the English language parser used to give orders", said Peter Turcan. "In addition, cannon sound effects have been added to take advantage of the Archimedes' impressive sound capabilities. A further benefit is the exceptionally rapid response time, thanks to the Risc processor".

Adapting Waterloo for the Archimedes involved writing a machine specific module to take advantage of the machine's power and converting more than 15,000 lines of code.

Unlike his previous programs, Peter is selling Waterloo for the Archimedes directly. It costs £24.95 plus £1 p&p and is available from Turcan Research Systems, 83 Greencroft Gardens, West Hampstead, London NW6 3LJ.

Disc rescue package

ARCHIMEDES owners can now repair their discs quickly and easily with Archimedes Disc Rescue - a new package from Look Systems (0603 764114).

Its three utilities work with both hard drives and floppy discs on most Archimedes filing systems including ADFS, SCSI, RamFS and IDE.

They will repair and recover files, directories and disc maps simply by selecting the appropriate filing system and drive number or by dragging the ailing file or directory onto the iconbar.

There is also a sophisticated disc editor allowing more confident users to navigate, edit and repair discs. Archimedes Disc Rescue costs £35 including manual.

ARM3 upgrade prices slashed

GROUND Control (0702 230324) have slashed the price of their ARM3 upgrade for the A300/A400 series from £299 to £230 inclusive of VAT and p&p.

"This effectively brings the price of our board down to just under £196 said Ground Control's Kevin Reeman. "The new price follows renegotiations with our ARM3, PCB and connector suppliers. ".

Sold as a DIY plug in, the 25MHz board is designed to speed up mathematical calculations, DTP, PC emulation, digitising and other functions. It is supplied with !ARMspeed software to control cache memory.

FREEBIES

worth over £700

FONTWISE
FONT EDITOR
clares

CLARES Micro Supplies have a long association with the Acorn market. Now they're concentrating on the increasing Archimedes platform, their 8 bit BBC Micro operation can sometimes be overshadowed. To show their commitment to the Acorn market as a whole, Clares are giving away five of each of their best selling BBC Micro packs exclusively to readers of *The Micro User*.

The Artroom Pack including the Art Colour Extension retails for £49.95. Completely icon-based this classic painting package is available on disc as a rom image in 3.5in or 5.25in formats which is then automatically loaded into your sideways ram.

Controlled by mouse or keyboard it includes all the features you'd expect in a sophisticated art package: Cut and paste, zoom with a pixel editor, rubber banding, geometrical shapes, inverse, fills, proportional fonts, air brushing, flips plus the ability to save all or part of a screen and much, much more.

Not restricted to the artistic alone, Artroom includes a ready-made graphics library enabling everyone to produce high quality results whatever your requirements. It works only on the Master and Master Compact.

If you feel happier creating your masterpieces in words, you can enhance your output with **Fontwise+** together with Clares Font Editor. Providing high quality dot matrix print as proportional and justified text it integrates with the Font Editor giving you 22 fonts in three sizes, with enlarged and condensed print, tabs and a temporary indent as standard. Just use your usual Epson compatible printer – no ram is needed in your printer – and you'll have fonts for all occasions at your fingertips for just £49.95.

Integrating well with all the major BBC Micro word processors – Wordwise, Wordwise+, Interword, View, Edword 2 and Mini Office – it is available on 3.5ins and 5.25ins disc for all 8 bit Acorn machines.

Using Fontwise+ from embedded commands or from the menu is easy. Just create your document in the usual way adding the Fontwise+ commands as required. Save in the normal manner and to print your chosen style boot the Fontwise+ disc, load your document and print. The Font Editor is an excellent enhancement as it allows you to edit the current fonts – or create your own from scratch.

The **Beta-Base Pack** also includes a utilities disc and usually costs £50. Again available on 3.5in or 5.25in disc, Beta-Base is a simple card index database.

A true random access disc-based database you can use it equally well with one or two, single or double-sided drives. With a maximum of 65,000 records each card can hold up to 200 fields, and each field up to 254 characters. All in all this makes it a very versatile system holding about 1,200 address-type records in each 100k.

The search facilities allow you to search in five fields as well as creating sub-sets. You can also sort 500 records on three fields – this increases to 750 in the ADFS version. In addition there are the usual features common to more sophisticated databases such as calculate, redefining titles, fields and so on, plus the ability to transfer one file to another and the excellent global entry option – extremely useful when inputting repetitive data.

The Utilities disc holds seven additional programs which enhance the standard transfer, search, label printing and packing programs, as well as a disc sort – so you can sort a whole disc at once. Two very useful additions are Status, which enables you to print the details of a named file, and MailMerge. This creates perfectly formatted letters containing data from your files and is fully compatible with View or Wordwise.

What to do

Simply write directly to *Micro User Freebie Offer, Clares Micro Supplies, 98 Middlewich Road, Rudheath, Northwich CW9 7DA.* Specify which of the three packs you would prefer – Artroom, Beta-Base or Fontwise+ – and in which format, and one of these classic packs could be yours.

There are 15 packages on offer and these will go to the first 15 readers whose name and addresses are pulled from the sack after 21 October 1991.

Keyboard is a real toughie

HOUSED in a steel case and completely sealed against dust and fluids, this new keyboard specially designed for use in harsh environments has been launched by Intek Electronics (0352 85603).

It is mounted inside an epoxy powder coated case and sealed with Neoprene rubber gaskets. The keys and gaps between them are sealed by a transparent flexible polyurethane overlay which Intek claims is undetectable. Special versions of the Armagard can be made for various interface types and layouts.

It costs £285.

New Arc control system

ARXE Systems (081-534 1198) have announced a new Archimedes/A3000 filing system, QuadFS, designed to replace the normal ADFS system for floppies and to take over the responsibility of reading/writing to all floppy discs.

Due out soon, it includes a card which will hold the new disc controller system and a 2Mb high density disc drive and will cost around £199. Arxe have also promised sophisticated additional software to support it.

Also announced is the next version of MultiFS. Version 2.00 will cost around £50.

Allowing the Archimedes to read/write to high density 1.4Mb Macintosh floppy discs, MacFS is another product in the pipeline. It will come with a number of supporting utilities to allow Macintosh files to be converted for use on the Archimedes and visa versa. The price should be around £50.

Other new products now available include J-Comp (£19.95) a graphics compression utility which uses the JPeg compression algorithm and ProDis, a comprehensive desktop disassembler for £29.95.

To be released for the Christmas market is Ray Tracer, described as the ultimate ray tracer for the Archimedes. Price to be fixed.

And Arxe has also announced some new games titles. Just out is Bambuzle, a puzzle game which challenges players to collect balls of the same colour while avoiding traps and tricks. Price, £19.95.

Available now is Blitz! which features twins Punch and Spike who are tranported by a time machine and must shoot killer bubbles to find hidden fuel crystals. Price £24.95.

Luton to host Watford super store

WATFORD Electronics' boss Nazir Jessa has revealed his plans for a warehouse-style computer superstore in Luton which will include a full range of Acorn products.

"It will be a really good Acorn centre before anything else", he told *The Micro User*.

Plans are to house three different selling styles in large purpose-built premises at present under construction. Firstly, customers will be able to buy products off the shelf with no technical help. A second counter will offer technical assistance and a third will give technical consultations, demonstrations and advice.

The new building will be ready for use on Christmas Eve but Watford will not move in until the New Year. The company is to retain its existing dealer outlet in Watford.

Meanwhile, they have announced a host of additions to their range of Acorn products. A new hand-held grey level scanner offers 400, 300, 200 and 100 dpi resolution at a full width of 105mm. In addition to grey scale, it also features three mono modes, black and white and two dither patterns and has a scanning speed of 3ms a line in all resolutions. Price to be fixed.

There is also a new hand-held, 105mm 12 bit colour scanner which offers 200 dpi resolution and a scanning speed of 3.5ms per line in all resolutions. In addition to colour, it also features three mono modes, black and white and two dither patterns. Price to be fixed.

For A3000 owners, Watford have launched a new I/O expansion card. It provides a BBC compatible analog port with 15 pin D connector; BBC compatible user port, with 20 way IDC connector and an InterIC (IIC) port with five pin DIN socket. Price, £42.

Watford's new IDE (Integrated Drive Electronics) interface card has been designed to bring the latest advances in PC hard disc technology within the reach of the Archimedes user. The 44Mb version costs £249, the 100Mb, £395 and the 200Mb, £535. Prices for 330 and 670Mb models have yet to be fixed.

New IDE hard cards for the A300 and A400 series are easy to instal, slotting into any vacant podule backplane slot. The 2.5in miniature hard drives are mounted on to professionally designed cards and are supplied with a fully Acorn-conformant IDE filing system, ready installed and ready to run. The 21Mb version costs £345 and the 44Mb, £495. Prices have yet to be fixed for the 89Mb model.

Rounding off Watford's new offerings are an Aries AlphaScan Monitor aimed at allowing Archimedes owners to exploit the full graphics potential of their machines; a VIDC enhancer board to increase Archimedes owners' choice of colour monitors and a cordless mouse. They cost £325, £45 and £65 respectively.

How to hit the top notes

ROBERT Fox Associates (0582 572148) have announced a new audio frequency enhancer cable for Archimedes and A3000 machines.

It allows a trebling of the frequency response to around 20,000Hz as opposed to the filtered output of around 6,000 Hz, increases fidelity and can reduce noise levels.

The cable intercepts audio signals entering the audio filter and passes out of the back of the computer to a stereo mini phone jack, similar to the one already on the machine.

By using the cable, both filtered and unfiltered sound becomes available using either jack for connection to headphones or external amplifiers.

On the Archimedes the cable utilises a connector already present on the motherboard thus retaining any warranties.

Coming clean

KEYMAX is an easy way to clean print heads on dot matrix printers. It consists of foil-backed sheets which hold small bubbles of cleaning fluid. When the print mechanism hits the surface, the fluid is released and dirt and ink are absorbed into the sheet.

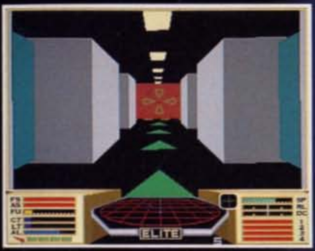
Available in continuous sheets for both 80 and 120 column printers, Keymax costs £7.50 plus VAT per carton. It is manufactured by Keymax (0279 454455).

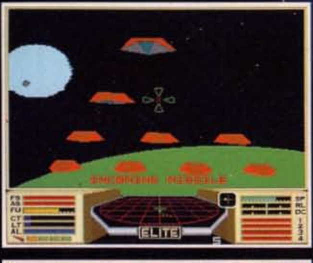
NAME: ELITE

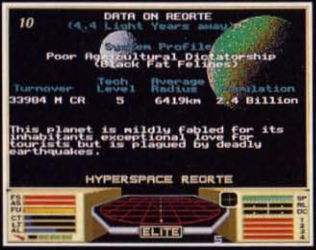
RATING: THE BEST-SELLING HOME COMPUTER GAME OF ALL TIME

STATUS: NOW FOR THE ACORN ARCHIMEDES, A3000 AND A5000

RIGHT ON COMMANDER!






10

DATA ON REORTE

(4.4 Light Years away)

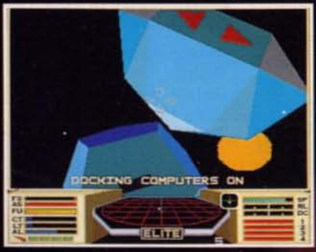
System Profile

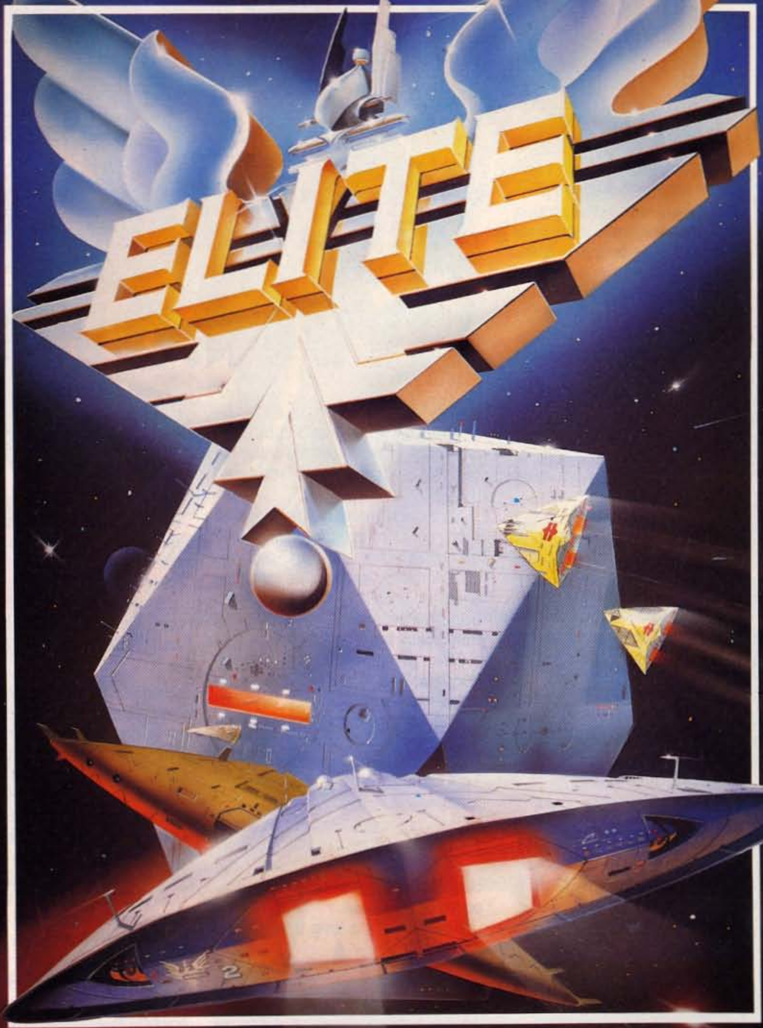
Poor Agricultural Dictatorship
(Black Fat Felines)

Turnover	Tech Level	Average Radius	Population
33984 M CR	5	6419km	2.4 Billion

This planet is mildly fabled for its inhabitants exceptional love for tourists but is plagued by deadly earthquakes.

HYPERSPACE REORTE





HYBRID PRESENTS IAN BELL & DAVID BRABEN'S "ELITE"

by WARREN BURCH & CLIVE GRINGRAS for ACORN ARCHIMEDES 1MB RAM RISC-OS

£39.95 CHEQUE OR POSTAL ORDER TO HYBRID

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- Enter The Realm
- Chopper Force
- The Last Ninja
- Pandora's Box
- Hunchback
- BBC U.I.M.
- Conqueror
- Hobgoblin
- Ballarena

Ultimate invincible sub

IN the September column I featured a routine that allows players of the Archimedes version of *U.I.M.* to create their own custom submariner files. Because I believe in trying to cater for all areas of my readership, I now present an equivalent routine for the BBC Micro version, once again courtesy of the author, Matthew Atkinson.

Type it in as shown on page 22 and save it to one of your own blank discs. Now make any required modifications to lines 390 to 1360 – change the &FF to zero to award yourself the item – and type RUN.

Your own custom submariner file will now be saved under the name "Cheat". To use it simply boot up and load Submariner Cheat. Happy submarining!

The bells ring again

Ever since the Master 128 first appeared on the market one of my major concerns has been the number of older games that were written using illegal techniques that happened to work without problems on the Model B and B+ but failed on the Master.

Regular readers will know that over the last few years I have frequently featured conversion programs which seem to have been very well received.

They went down well with people who, having upgraded from a B or B+ to a Master, found that a substantial proportion of their software collection had at a stroke been rendered unusable.

My modest successes have inspired a number of readers to attempt their own conversions, and Alan Fairclough of Tranmere, Merseyside has now come up with a routine to convert Superior's original Mk.2 copy of **Hunchback** to run on the Master.

The reason for the original Hunchback not working on the Master is that it attempts to read the keyboard directly from the output register of the System 6522 VIA, rather than through the operating system's INKEY routine.

The System 6522 is used differently on the Model B and Master, and if my memory serves me correctly, it's something to do with the Model B's System 6522 being set up to support the Speech Synthesiser, which isn't supported on the Master.

However, it's a long time since I looked into it, so don't quote me on that. Getting back to the conversion, you can tell the two Superior original (non-compilation) cassette versions apart because the Mk.1 version has two files, both called HUNCHBACK, the second of which loads using OSBGET, so the cassette motor clicks after each block has been loaded.

The Mk.2 version has two files – HUNCHBACK and ? – and also the *Superior Software* and *Hunchback* logos on the cover of the Mk.2 version display a 3D effect.

My original copy of Hunchback is also the Mk.2 version, so I cannot offer any help to anyone who may be experiencing problems with Mk.1.

However, as usual, if anyone wants to send me their troublesome copy, together with suitable return postage and packaging, I will see what I can do.

Readers who do not own a copy may be interested to know that a Master-compatible version appears on Superior's Play It Again Sam 6 compilation, together with Galaforce II, Hopper and The Sentinel on the BBC version and Video's Revenge on the Electron.

Burn, baby, burn

A number of readers have been experiencing real problems at the end of the first level of **The Last Ninja** in that they cannot kill the dragon. To do this you must use a smoke bomb, which you find on the bank of the wide river. I quote from Superior's own solution:

"Stand a good distance away, as far left off the path as you can go, so the bombs explode *in between the dragon's eyes*. This kills it and allows you by, otherwise you fry!"

From my own experience it's not as easy as that. I found it a very tricky operation, and had to play out the first level over and again before I got my aim pixel perfect.

However, like the storming of the embassy in Hostages, once mastered, you can normally get it right every time.

Things that go "cheat" in the night

Martin Bastable of Stafford has a tip for **Hobgoblin** by Atlantis that allows you to award yourself extra lives at will. While you are playing, press Pause then Control+L. This key sequence can be repeated any number of times and each press gets you an extra life. Thank you Martin.

See the conquering hero come

David Alexander of Bromley Cross, Lancashire, has a useful tip for **Conqueror** to add to those provided by Jonathan Griffiths in the July 1991 column.

If you are sitting motionless, waiting for your tank to be repaired, and you see an enemy tank approaching on your radar, don't worry.

Just sit tight and it usually won't "see" you and will just roll straight past.

Sneaky stuff, David.

Jumps and pirouettes

Jonathan Knibb of Barwell, Leics., and Michael Scott of Crook, County Durham, have sent me the passwords for the 15 levels of **Ballarena** by Eterna. They are:

1. PUNKANDJUMP
2. MONTPELLIER
3. SEA SEX SUN
4. VL 86 C 010
5. MOUNTAINEERS
6. GRENOUILLE
7. BLUBEDILOMAR
8. BRAIN KILLER
9. RHYTHM BOX
10. BOUBOULOID
11. MENFOU
12. 32 BIT POWER
13. MARTINI
14. SEE YOU SOON
15. ETERNA

Thank you, Jonathan and Michael.

STOP PRESS

A scant few hours before I was due to leave England for a backpacking tour of the Greek Islands I received three discs containing preview screenshots of the latest Archimedes releases from the brothers Botterill, otherwise known as The Fourth Dimension.

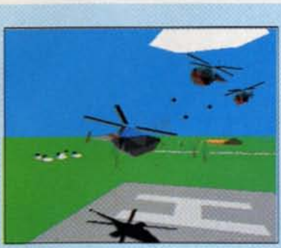
They comprise two arcade adventures – Enter The Realm and Pandora's Box – and a strategic shoot-'em-up by the name of Chopper Force.

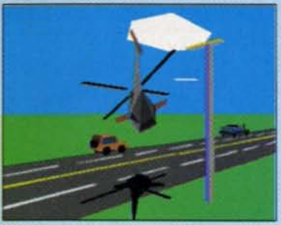
Pandora's Box features a 3D isometric screen display as pioneered by Ultimate with Knight Lore and Alien-8, Enter The Realm is viewed side-on, while Chopper Force looks to have a Chocks Away feel to it.

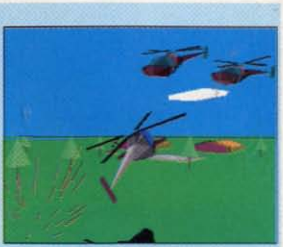
Although the accomanying documentation stressed that all three offerings were incomplete pre-release versions, they all look superb and will further enhance The Fourth Dimension's reputation for producing quality software.

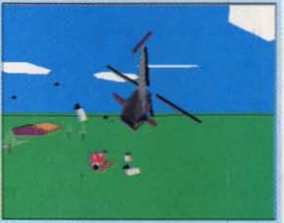
More on these in the next column, so until then, play on!

CHOPPER FORCE

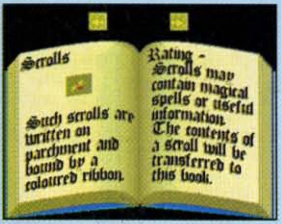








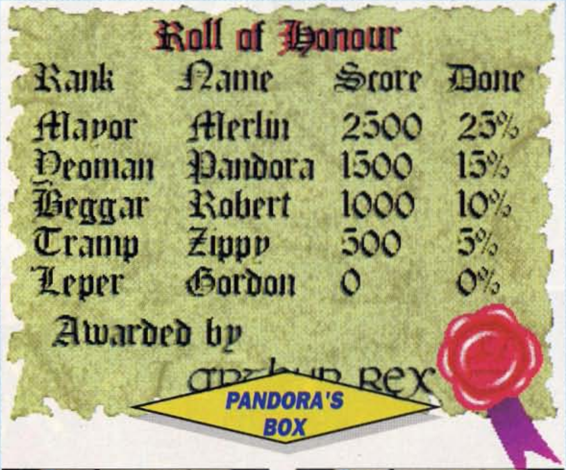
PANDORA'S BOX



Scrolls

Such scrolls are written on parchment and bound by a coloured ribbon.

Rating - Scrolls may contain magical spells or useful information. The contents of a scroll will be transferred to this book.

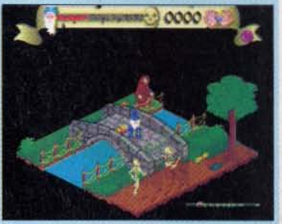


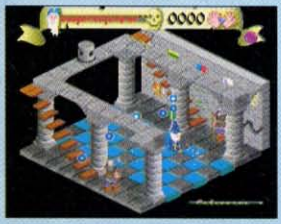
Roll of Honour

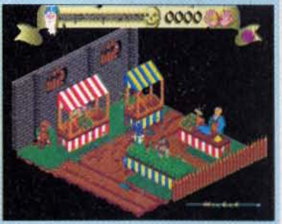
Rank	Name	Score	Done
Mayor	Merlin	2500	25%
Yeoman	Pandora	1500	15%
Beggar	Robert	1000	10%
Tramp	Zippy	500	5%
Leper	Gordon	0	0%

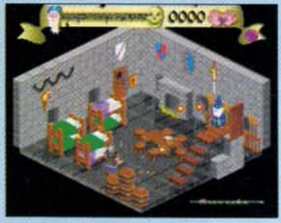
Awarded by

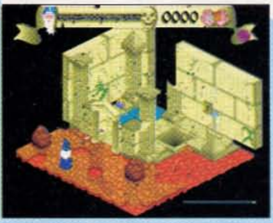
Arthur Rex

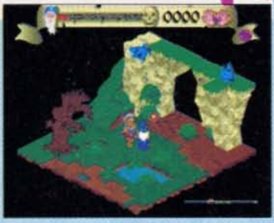


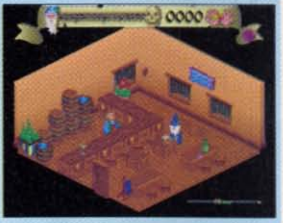




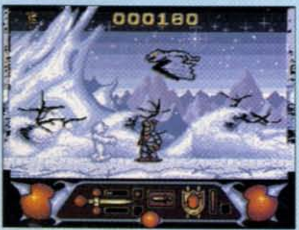


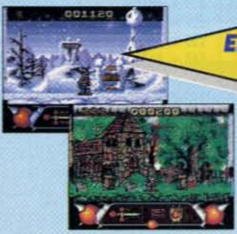


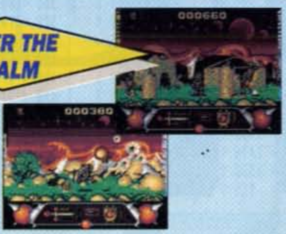


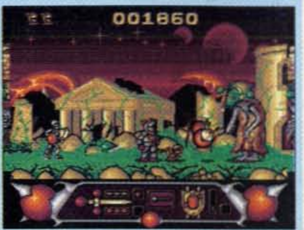


ENTER THE REALM

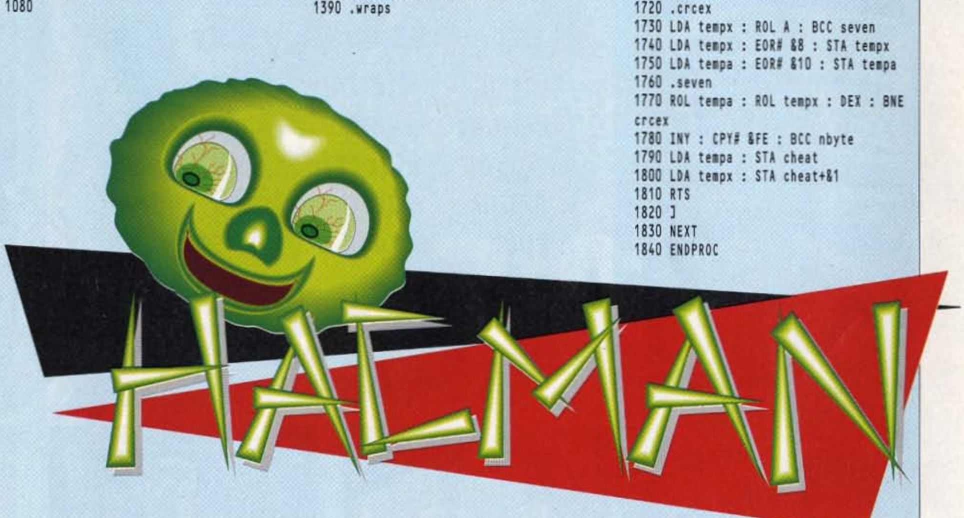








```
10 REM >CHEAT
20 *K.0 MO.7|M VDU 14|M L.1200,|M
30 *K.1 RUN|M
40 *K.2 REN.|M
50 *K.3 P."L%,"P%|M
60 *K.10 O.|M*FX12,2|M
80 PROCassemble
90 CALL ENCOD
100 CLS
110 *FX21 0
120 PRINT"Press a key to save Submariner
Cheat"
130 F=GET
140 CLS
150 PRINT"Saving..."
160 *SAVE U.Cheat 0A00 +0100 0A08
170 CLS
180 PRINT"Complete."
190 END
200
210 DEFPROCassemble
220 M%=&8000
230 Q%=&2678
240 tempa=&70
250 tempx=&71
260 swram=&84
270 oldrm=&F4
280 cheat=&AFE
290 MASTR=&B00
300 GALAX=&AF00
310 SWEET=&B79B
320 SHELA=&FE00
330 WTFRD=&FF30
340 OSW=&FFEE
350 FOR A%=0 TO 2 STEP 2
360 P%=&A00
370 [OPTA%
380 \ General purpose variables
390 .money EQUW 400   ;Network Dollars
400 .point EQUB 0     ;Network index
410 .magns EQUB 1     ;No. of flares
420 .fract EQUB 0     ;Money fraction
430 .minut EQUB 3     ;No. of torpedos
440 .galax EQUB 0     ;Current network
450 .plant EQUB 51    ;Current port
460 .retun RTS
470 .fuels EQUW 16    ;Fuel holding
480 .treks EQUB &FF   ;Mission flag
490 .presy EQUB 0     ;Process control
500 .ships EQUB 0     ;>=128 in ocean
510 .heats EQUB &FF   ;Heat shield
520 .smine EQUB 1     ;No. of seamines
530 .sixtn
540 EQUD 0 : EQUD 0 : EQUD 0 : EQUD 0
550 EQUD 0 : EQUD 0 : EQUD 0 : EQUD 0
560
570 \ Equipment list =0 present
580 .missl EQUB &FF   ;Do not alter
590 .mines EQUB &FF   ;Do not alter
600 .pbeam EQUB &FF   ;Soxel gen.
610 .phase EQUB &FF   ;Phasor bomb
620 .flare EQUB &FF   ;Do not alter
630 .cloak EQUB &FF   ;Cloaking device
640 .nbeam EQUB &FF   ;Chlorel gen.
650 .empdv EQUB &FF   ;EMP
660 .tract EQUB &FF   ;Manipulator arm
670 .chaff EQUB 0     ;Chaff
680 .xlase EQUB &FF   ;Hydrox gen.
690 .chamn EQUB &FF   ;Chameleon unit
700 .glase EQUB &FF   ;Goledy gen.
710 .therm EQUB &FF   ;Thermosystem
720 .targe EQUB &FF   ;Re-target
730 .headu EQUB &FF   ;Head up display
740 .juice EQUB &FF   ;Do not alter
750 .cargo EQUB &FF   ;Cargo pod
760 .sheld EQUB &FF   ;Do not alter
770 .fconv EQUB &FF   ;Fuel convertor
780 .eurek EQUB &FF   ;Central computer
790 .telep EQUB &FF   ;Teleporter
800 .navig EQUB &FF   ;Navigation mod.
810 .phexa EQUB &FF   ;Portfolio
820 .rentr EQUB &FF   ;Re-entry mod.
830 .missn EQUB &FF   ;Mission mod.
840 .finan EQUB &FF   ;Financial mod.
850 .drive EQUB &FF   ;Ocean drive
860 .deftr EQUB &FF   ;Deflectors
870 .gravi EQUB &FF   ;Graviton detec.
880 .alock EQUB &FF   ;Air lock
890 .mmodl EQUB &FF
900
910 \ Extra equipment =0 present
920 .melog EQUB &FF
930 .btrap EQUB &FF
940 .neurl EQUB &FF
950 .fcell EQUB &FF
960 .tutor EQUB &FF
970 .zener EQUB &FF
980 .ttape EQUB &FF
990 .jubox EQUB &FF
1000 .suicd EQUB &FF
1010 .droid EQUB &FF
1020 .scoop EQUB &FF
1030 .wethr EQUB &FF
1040 .spech EQUB &FF
1050 .gunne EQUB &FF
1060 .socio EQUB &FF
1070 .archv EQUB &FF
1080
1090 .strin
1100 EQUD 0 : EQUD 0 : EQUD 0 : EQUD 0
1110
1120 \ Flags for equipment
1130 \ BIT7=1 Mass critical
1140 \ BIT6=1 On bottom panel
1150 .edent
1160 EQUD &80004040 : EQUD &00008040
1170 EQUD &00004080 : EQUD &40808000
1180 EQUD &80408040 : EQUD &00408040
1190 EQUD &80404040 : EQUD &40800000
1200
1210 \ Commodity, share and currency
1220 .comod
1230 EQUD &FFFFFFFF   ;Commodty identity
1240 EQUD 0           ;LSB commodity no.
1250 EQUD 0           ;MSB commodity no.
1260 EQUD 0           ;Commodity type
1270 .share
1280 EQUD &FFFFFFFF   ;Share identity
1290 EQUD 0           ;LSB share no.
1300 EQUD 0           ;MSB share no.
1310 EQUD 0           ;Not used
1320 .filfi
1330 EQUD &FFFFFFFF   ;Currency identity
1340 EQUD 0           ;LSB currency
1350 EQUD 0           ;MSB currency
1360 EQUD 0           ;Fraction currency
1370
1380 \ Network Index Values
1390 .wraps
1400 EQUW M%+RND(Q%)
1410 EQUW M%+RND(Q%)
1420 EQUW M%+RND(Q%)
1430 EQUW M%+RND(Q%)
1440 EQUW M%+RND(Q%)
1450 EQUW M%+RND(Q%)
1460 EQUW M%+RND(Q%)
1470 EQUW M%+RND(Q%)
1480
1490 .buffr
1500  LDA# &7
1510  JSR OSW
1520  SEI
1530  LDX swram
1540  STX oldrm
1550  STX SHELA+&30
1560  STX SHELA+&32
1570  STA WTFRD,X
1580  CLI 1590  JSR GALAX
1600  JSR SWEET
1610  JMP MASTR
1620  1630 ]
1640 L%=P%
1650 P%=&C00
1660 [OPT A%
1670 .ENCOD
1680 LDY# &0 : STY tempx : STY tempa
1690 .nbyte
1700 LDA tempx : EOR money,Y
1710 STA tempx : LDX# &8
1720 .crcex
1730 LDA tempx : ROL A : BCC seven
1740 LDA tempx : EOR# &8 : STA tempx
1750 LDA tempa : EOR# &10 : STA tempa
1760 .seven
1770 ROL tempa : ROL tempx : DEX : BNE
crcex
1780 INY : CPY# &FE : BCC nbyte
1790 LDA tempa : STA cheat
1800 LDA tempx : STA cheat+&1
1810 RTS
1820 ]
1830 NEXT
1840 ENDPROC
```



Get it right ✓

```
 10 =    0 0
 20 = 892F F
 30 = 8D0D F
 40 = 1E69 2
 50 =  795 9
 60 = 3902 F
 80 = 126A 2
 90 = 7AF5 5
100 = 7A16 C
110 = 6EF7 2
120 = CC04 5
130 = 398B 6
140 = 7A16 1
150 = 4350 C
160 =  1C5 5
170 = 7A16 A
180 = 6C12 7
190 = FD2E 0
200 = D1AD 6
210 = 98E9 E
220 = 4C52 D
230 = A2C5 4
240 = D66B 5
250 = 6A6C 8
260 = ECF5 7
270 = 886C F
280 =  E97 5
290 = E007 5
300 = 72DA 2
310 = 9EFA 4
320 = D3DC 1
330 =  A36 F
340 = 9FE1 2
350 = BFB0 5
360 = B886 D
370 = 7AA8 F
380 =    0 F
390 = 4816 D
400 = 2FF4 D
410 = 3F8E 2
420 = 2DFC E
430 = B277 E
440 =  E42 3
450 = B1AC 1
460 = 9200 8
470 = 5AE2 1
480 = 4641 9
490 = 884F 0
500 = 3123 1
510 = 9B11 5
520 = 872F A
530 = D406 8
540 = B17D 4
550 = B17D 1
560 = D1AD 9
570 =    0 9
580 = F336 7
590 =   D7 2
600 = 16D6 7
610 = C14C 2
620 =  972 F
630 = 94A5 2
640 = 2023 2
650 = B331 3
660 = C4A4 E
670 = EBC4 A
680 = B929 4
690 = B8D6 F
700 = F247 6
710 = F7B5 1
720 = 4DAF 7
730 = 4D36 B
740 = FAEE 4
750 = DCA9 D
760 = EA0E B
770 = 3041 9
780 = 9B79 B
790 = 4493 3
800 = E5E7 D
810 = D92A F
820 = D0BF E
830 = C809 2
840 = A59C 1
850 = 99C1 2
860 = 84EF 8
870 = 797D 4
880 = 1563 8
890 = 9911 B
900 = D1AD F
910 =    0 F
920 = B624 6
930 = 824E 0
940 = 9133 A
950 = C424 A
960 = 8C73 6
970 = 52E4 6
980 = A683 F
```

Watford Electronics *presents ....*

Winter Hands-On Open Day

Sponsored by: The Micro User and BBC Acorn User

To Be held at:
JESSA HOUSE
on SUNDAY
1st December 1991
10.00am to 4.00pm

SALES ADVICE

Watford Electronics Technical and Sales personnel will be on hand to discuss all your technical queries and computer requirements. Come and see live demos of popular BBC/Archimedes Software, Hardware and Watford Electronics own range of PC Compatibles.

Yet another chance to bring the family and visit Watford Electronics to watch, learn, and talk to other like minded enthusiasts, experts and novices on the subject of Acorn BBC and Archimedes range of home computer systems.

Hardware and Software – Amongst various products, we shall be demonstrating our NEW ...

Archimedes Hard Card
Archi COLOUR Hand Scanner
Aries Alphascan Monitor
Archimedes Hi-Res Graphics Card
Archi Real Time COLOUR Digitiser
ARM 3 Upgrade – for A300/400 and A3000

Also appearing will be **NEW** products from:

Acorn Computers
Minerva
Colton Software
Computer Concepts
Taxan UK
Panasonic UK
Silicon Vision
Superior Software

Technical Support

- **Watford Electronics:** Our technical team will be available to discuss any technical queries and offer advice.
- **BBC Acorn User:** Contributors and the editorial team will be at hand to answer all your questions.
- **The Micro User:** Mike Cook will be available to help and advise on matters related to BBC/Master.
- **Gordon Taylor:** The renowned Archi 'Guru' and technical writer will be available to advise on matters related to Archimedes.
- **Acorn Computer's** representatives will talk about proposed new products and answer all your questions.

Educationalist Support

- A private area allocated to the specialist in education will be provided.
- Staff will be on hand to talk about current trends and requirements in the educational sector.
- Watford Electronics Managing Director, Nazir Jessa, will be happy to discuss special deals and packages for individuals & educational establishments.

Instant Finance available up to £1,000

Purchases can be made at the Open Day and Instant Credit deals will be available via Lombard Tricity Finance Ltd (subject to status). Extended finance over 36 months on any purchase over £300 + VAT (APR 36.8%). Identification will be required, ie Driving Licence, Credit Card and Bank Card. A deposit of 10% of your purchase is all you need to pay on the day.

***** FREE REFRESHMENTS WILL BE SERVED *****

Orion Computers Ltd.

Qualified Acorn Dealer ☆ Component Level Service Centre *Econet Service & Installation Centre ☆ Citizen Premier Dealer*

PLEASE REMEMBER WHEN COMPARING PRICES - WE DO NOT CHARGE CARRIAGE

on standard delivery within the UK. Next Day Courier Service £6.00 Carriage on Export Orders charged at cost.

Ordering Information

By Post

Please send your orders including a signed cheque, postal order or credit card number & expiry date (**NOT CASH**) to:

Department MU11
Orion Computers Limited
Units 18e & 18f Boxer Place
Moss Side Employment Centre
Leyland, Preston, PR5 3QL

All cheques and bankers drafts to be made payable to
Orion Computers Limited

By Telephone

Telephone orders may be place between 9:00am and 5:00pm
Please have your credit card number and expiry date ready

Tel: **(0772) 623000** Fax: **(0772) 622917**

In Person

Callers most welcome. We are situated 3 miles from M6 J28.
on the Moss Side Employment Centre
(Please see October '91 Issue for directions from the motorway)

All offers subject to availability. Government & Educational Orders Welcome. **Minimum Order Value £10.00. Minimum Educational Order Value £15.00. Please note. VAT is quoted at 17.5%**

Acorn Computers

Special Offer when purchased with computer!!

A3000 -	£35.00 discount off other goods bought with computer, plus either 2Mb Upgrade F.O.C., 4Mb for £100.00
A410/1 -	40Mb IDE HD + Upgraded to 2Mb F.O.C.
A420/1 -	100Mb IDE HD + Upgraded to 4Mb F.O.C.
A440/1 -	ARM 3 F.O.C.
A540 -	4Mb RAM Upgrade F.O.C.

Description	*Ex. VAT*	*Inc. VAT*
BBC Master 128K	399.00	468.83
BBC A3000	599.00	703.83
BBC A3000 Special Access	699.00	821.33
BBC A3000 Learning Curve	699.00	821.33
Archimedes 410/1	1099.00	1291.33
Archimedes 420/1 Learning Curve	1299.00	1526.33
Archimedes 440/1	1699.00	1996.33
Archimedes 540	2995.00	3519.13

Prices subject to change - call for latest prices

We operate the Acorn Education Scheme.

We can supply A3000's on the Acorn 0% Finance Scheme.

Finance available over twelve months.	Deposit	Monthly
A3000 Learning Curve Base	£107.66	£59.00
A3000 Learning Curve Colour	£160.21	£79.00

Finance Prices Shown above **INCLUDE VAT**

Cables

Description	*Ex. VAT*	*Inc. VAT*
Arc to Monitor + Audio 1.2m (Not 8833 II)	£8.65	£10.16
Arc to 8833 Mk II Monitor Cable + Audio 1.5m	£8.65	£10.16
Arc Monitor Extension Cable 2m	£7.75	£9.11
BBC B to AKF17 Monitor 2m	£8.65	£10.16
Arc Parallel Printer Cable 1.8m	£5.25	£6.17
Arc Parallel Printer Cable 3m	£10.40	£12.22
Arc to BBC Serial Cable 1.2m	£6.95	£8.17
Arc Keyboard Extension Cable 2m	£7.75	£9.11
Arc Mouse Extension Cable 2m	£7.75	£9.11
Arc Keyboard Replacement Cable	£6.95	£8.17
Arc Mouse Replace. Cable (State Type)	£6.95	£8.17
4 way trailing Lead	£7.75	£9.11
Surge protector plug	£10.50	£12.34
4 way protector socket on trailing lead	£17.95	£21.09

We can supply almost any cable made to order.
Please call for details.

NEW ADDRESS

Due to continued expansion we are moving once again. Our new showroom will open from Tuesday 5th November, and to celebrate, thousands of bonfires will be lit all over the country! Our old premises will close after business on Thursday 31st October, so we will be closed for a few days during the relocation.

Our new address wil be:
250 Leyland Lane, Leyland, Preston,
PR5 3HL

A new map will appear in next month's Micro User to show how to find us. We have, in fact, only moved approximately ¾ of a mile.

A400/1 Accessories

Items marked with an * can be used on A300/540.

Description	*Ex. VAT*	*Inc. VAT*
1Mb RAM Upgrade	£39.00	£45.83
2Mb RAM Upgrade	£75.00	£88.13
3Mb RAM Upgrade	£105.00	£123.38
Above memory fitted for £10.00		
Acorn Ethernet Card	£219.00*	£257.33
Acorn SCSI Card	£239.00*	£280.83
Arm 3 Upgrade (Adelph One)	£349.00	£410.08
4Mb to 8Mb Upgrade	£649.00	£762.57
Com. Con. Scan-Light Mk II A4	£369.00*	£433.58
Com. Con. Sheet Feeder for above	£149.00*	£175.08
Com. Con. Scan-Light + Feeder	£454.00*	£533.45
Com. Con. Scan-Light Junior	£174.00*	£204.45
Com. Con. Scan-Light 256	£205.00*	£240.88
Com. Con. Sheet Feeder for A4	£94.00*	£110.45
Lingenuity SCSI Card	£169.00*	£198.58
Acorn MIDI Expansion Card	£65.00*	£76.38
Acorn I/O Expansion Card	£79.00*	£92.83
Acorn MIDI Upgrade for above	£27.00*	£31.73
VIDC Enhancer	£27.00	£31.73
Econet Module	£48.00*	£56.40
Beebug Disc Buffer	£29.00	£23.08
Orion TV Modulator + Audio	***£65.00****	***£76.38***
Archimedes 540 Only		
4Mb RAM Upgrade (Upto 16Mb)	£479.00	£562.83
VIDC Enhancer (540 only)	£10.00	£11.75

A3000 Accessories

Description	*Ex. VAT*	*Inc. VAT*
Orion 1 Mb RAM Upgrade	£55.00	£64.63
(Expandable to 4Mb using only 8 chips)		
Orion 3 Mb RAM Upgrade	£156.00	£183.30
Serial Upgrade	£18.00	£21.15
Acorn User Port/Midi Card	£46.00	£54.05
Acorn Monitor Stand	£27.00	£31.73
PRES Monitor Stand	£24.95	£29.32
PRES System Housing	£69.50	£81.66
HCCS 45Mb HardCard	£339.00	£398.32
CC Scanlight Junior A3000	£174.00	£204.45
CC Scanlight A4 Mk II A3000	£369.00	£433.58
CC Sheetfeeder for A4 Scanner	£149.00	£175.08
CC Scanlight A4 + Sheetfeeder	£454.00	£533.45
CC Scanlight 256	£205.00	£240.88
RTFM Joystick Interface + S/W Disk	£34.95	£41.07
Serial Port Joystick Interface	£22.95	£26.97
Voltmace DeltaCat Joystick	£26.00	£30.55
Lingenuity SCSI Controller Card	£149.00	£175.08
Orion TV Modulator + Audio	***£65.00***	***£76.38***

Books

Description	*Ex. VAT*	*Inc. VAT*
Programmers Reference Manuals	£77.00	£77.00
BASIC V Guide	£19.45	£19.45
A3000 Technical Guide	£28.95	£28.95
A540 Technical Guide	£65.00	£65.00
Basic V: A Dabhand Guide	£9.95	£9.95
Archimedes First Steps	£9.95	£9.95
Archimedes Assembly Language	£14.95	£14.95

Extra Manuals

Description	*Ex. VAT*	*Inc. VAT*
Acorn D.T.P.	£10.00	£10.00
1st Word Plus Release 2	£10.00	£10.00
ANSI C Release 3	£20.00	£20.00
ANSI C Release 4 (Desktop C)	£25.00	£25.00
Acorn Assembler Rel. 2 (Desktop Ass.)	£25.00	£25.00

Orion Bulk Diskettes

All our disks come complete with labels etc. and are
100% certified error free. In the event that a disk fails it will be replaced immediately.
Top row of prices ex. VAT. Bottom row of prices inc. VAT.

		Quantity					
		25	50	100	250	500	1000
5¼	DS/DD 96tpi	N/A N/A	£14.00 £16.45	£26.00 £30.55	£60.00 £70.50	£115.00 £135.13	£210.00 £246.75
3½	MF/2DD 1Meg	£9.75 £11.46	£19.50 £22.91	£34.00 £39.95	£77.50 £91.06	£145.00 £170.38	£270.00 £317.25
	Sony Bulk	£12.50 £14.69	£25.00 £29.38	£45.00 £52.88	£106.25 £123.84	£200.00 £235.00	£375.00 £440.63

Printers

PLEASE NOTE

ALL our printers are **UK** Models and **NOT** grey imports.
Please take this into account when deciding where to purchase your printer.

Description	Ex. VAT	Inc. VAT
C.C. Qume Laser Direct	£859.00	£1009.33
C.C. 600 DPI Expansion Card	£309.00	£363.08
Canon LBP4 Laser for above	£659.00	£774.33
C.C. 600 DPI LBP8 Laser Direct	£1319.00	£1549.83
(Free Impression II with Qume/LPB8 Laser Direct)		
Canon Bubblejet BJ10e (White or Black)	£219.00	£257.32
Citizen 120D+ (Parallel)	£115.00	£135.13
Citizen 124D	£165.00	£193.88
Citizen Swift 9	£162.00	£190.35
Citizen Swift 24	£225.00	£264.38
Citizen Swift 24x	£329.00	£386.58
H.P. Deskjet 500	£339.00	£398.32
Star LC20	£130.00	£152.75
Star LC200 Colour	£175.00	£205.63
Star LC24-200 Mono	£205.00	£240.88
Star LC24-200 Colour	£249.00	£292.58

Ribbons (Branded)

Description	Ex. VAT	Inc. VAT
Amstrad DMP2000/3160	£5.50	£6.46
Canon BJ130 Bubblejet (BJI481)	£10.00	£11.75
Canon BJ10e Bubblejet (BC01)	£16.29	£19.14
Canon BJ300/330 Bubblejet (BJI642)	£12.00	£14.10
Citizen 120D	£3.25	£3.82
Citizen Swift 24 Black	£3.95	£4.64
Citizen Swift 24 Colour	£13.75	£16.16
Colourjet 132/Canon PJ1080 Black	£9.25	£10.86
Colourjet 132/Canon PJ1080 Colour	£14.75	£17.33
Epson LX80/86	£3.75	£4.41
Epson FX80,MX80,LX800	£4.50	£5.29
Epson LQ400,550 Fabric	£5.25	£6.17
Epson MX100,FX1000,FX1050	£5.75	£6.76
Epson EX800/1000 Black	£7.25	£8.52
HP Paintjet Black	£21.00	£24.68
HP Paintjet Colour	£26.00	£30.55
HP Deskjet + (Permanent Ink)	£13.20	£15.51
Panasonic KXP145,KXP115	£7.50	£8.81
Panasonic KXP140	£9.35	£10.99
Star LC10	£3.80	£4.47
Star LC10 4 Colour	£5.75	£6.76
Star LC200 Black	£5.00	£5.88
Star LC200 Colour	£9.75	£11.46
Star LC24/10 / LC24 200 Black	£4.75	£5.58
Star LC24 200 Colour	£11.50	£13.51
Canon LBP4 Toner Cartridge	£55.00	£64.62
Canon LBP8 Toner Cartridge	£62.00	£72.85
Qume Crystal Print Toner Set	£67.00	£78.73
Qume Crystal Print Drum Set	£89.00	£104.58

Ribbons (Comp.)

All of our compatible ribbons are high quality British brand.

We do not sell "White Box" compatible ribbons.

Description	Ex. VAT	Inc. VAT
Brother M1009,M1109	£2.95	£3.47
Brother HR10,15,20,25,35 Fabric	£3.25	£3.82
Brother HR10,15,20,25,35 Multistrike	£4.65	£5.46
Canon PW1080A	£3.85	£4.52
Citizen 120D/Swift 24	£3.05	£3.58
Epson LX80,86	£2.25	£2.64
Epson FX80,MX80,LX800,LX850	£2.95	£3.47
Epson LQ500,LQ800,LQ850	£3.00	£3.53
Epson LQ1000,LQ1050,FX1000	£3.50	£4.11
Epson LQ2500,LQ2550	£3.55	£4.17
Epson EX800	£4.45	£5.23
Panasonic KXP1081,1090,1080	£3.65	£4.29
Panasonic KXP1124	£3.55	£4.17
Star LC10	£2.55	£3.00
Star LC10 4 Colour	£5.00	£5.88
Star LC24/10	£3.95	£4.64

Please call for prices on any ribbons not listed here. We can supply almost any ribbon required and, dependent on quantity, any colour.

Please Note - Quoting the KARMA Group Code speeds up our search for a ribbon compatible with your printer.

Archimedes/A3000 Software

DTP

Description		Ex. VAT	Inc. VAT
Impression II (CC)		£129.00	£151.57
Impression Junior (CC)		£74.00	£86.95
Impression Business Supplement	**NEW**	£42.00	£49.35
EasiWriter (Icon Technology)	**NEW**	£134.00	£157.45
Desktop Folio (ESM)		£79.00	£92.83

Spreadsheets

Description		Ex. VAT	Inc. VAT
Sigmasheet (Minerva)		£39.95	£46.94
Schema (Clares)		£99.00	£116.33

WordProcessors

Description		Ex. VAT	Inc. VAT
1st Word Plus Release 2 (Acorn)		£69.95	£82.19
Eas!Word (Minerva)		£31.95	£37.54
Protext 5.0 (Arnor)		£119.00	£139.83

Integrated Packages

Description		Ex. VAT	Inc. VAT
Pipedream 3 (Colton)		£119.00	£139.83
Desk Top Office (Minerva)		£99.00	£116.33

Databases

Description		Ex. VAT	Inc. VAT
Datavision (Silicon Vision)		£127.45	£149.75
Flexifile (Minerva)		£119.00	£139.83
Multistore (Minerva)		£199.00	£233.83
Genesis II (Oak Solutions)		£119.00	£139.83
Knowledge Organiser (Clares)		£42.00	£49.35

Accounting Software

Description		Ex. VAT	Inc. VAT
Financial Accountant (S. Vision)		£233.75	£274.66
Home Accounts (Minerva)		£39.45	£46.35
Business Accounts (Minerva)		£325.00	£381.88
Office Tools (S. Vision)		£318.75	£374.53

Languages

Description		Ex. VAT	Inc. VAT
ANSI C Release 3 (Acorn)		£125.00	£146.88
Desktop C (Acorn)	**NEW**	£189.00	£222.08
Desktop Assembler (/Acorn)	**NEW**	£129.00	£151.58
RiscForth (S. Vision)		£127.45	149.75

Music

Description		Ex. VAT	Inc. VAT
Armadeus (Clares)		£61.00	£71.68
Rhapsody II (Clares)	**NEW**	£44.95	£52.82
Tracker (Serial Port)		£38.95	£45.77

Utilities

Description		Ex. VAT	Inc. VAT
Arc DFS (Dabs Press)		£22.95	£26.97
Dot Matrix Colour Printer Driver (Ace)		£12.72	£14.95

Education

Description		Ex. VAT	Inc. VAT
Fun Sch. 3 Under 5's (Database)	**NEW**	£18.00	£21.15
Fun Sch. 3 5-7 (Database)	**NEW**	£18.00	£21.15
Fun Sch. 3 Over 7's	**NEW**	£18.00	£21.15

Graphics Manipulation

Description		Ex. VAT	Inc. VAT
Poster + Fonts (4Mation)		£79.00	£92.83
Render Bender II (Clares)	**NEW**	£99.00	£116.32
Solids Render (S. Vision)		£127.45	£149.75

Graphics - Art

Description		Ex. VAT	Inc. VAT
Artisan II (Clares)		£49.95	£58.69
Pro Artisan (Clares)		£79.00	£92.83
Atelier (Minerva)		£79.00	£92.83
Clipart Coll. Vol. 1 (General)		£19.95	£23.44
Clipart Coll. Vol. 2 (General)	**NEW**	£25.49	£29.95
Clipart Coll. Vol. 3 (Animals)	**NEW**	£25.49	£29.95
Clipart Coll. Vol. 4 (Sport)	**NEW**	£25.49	£29.95
Clipart Coll. Vol. 5 (Characters)	**NEW**	£25.49	£29.95

Misc

Description		Ex. VAT	Inc. VAT
PC-Emulator V1.6 (Acorn)	**NEW**	£94.00	£110.45
Investigator II (Serial Port)		£22.95	£26.97

Games

Description		Ex. VAT	Inc. VAT
Arcpinball (Shibumi)		£18.00	£21.15
ARCticulate (4th Dim.)		£18.00	£21.15
ARCtist (4th Dim.)	**NEW**	£18.00	£21.15
Ballarena (Eterna)		£14.45	£16.98
Blowpipe (Eclipse)		£14.45	£16.98
Blaston (Eterna)		£14.45	£16.98
Boogie Buggy (4th Dim.)		£18.00	£21.15
Break 147/Superpool (4th Dim)	**NEW**	£18.00	£21.15
Bubblefair (Eterna)	**NEW**	£14.45	£16.98
Chess 3D (Micropower)		£14.45	£16.98
Chequered Flag (CIS)	**NEW**	£18.00	£21.15
Chocks Away Version II (4th Dim.)		£18.00	£21.15
Chocks Away Extra Missions		£14.45	£16.98
Chocks Away Compendium		£28.00	£32.90
Chuck Rock (Krisalis)	**NEW**	£19.00	£22.33
Drop Ship (4th Dim.)		£14.45	£16.98
E - Type (4th Dim.)		£14.45	£16.98
E - Type 100 Miles (4th Dim.)		£12.75	£14.98
Fine Racer (Eterna)		£14.45	£16.98
Holed Out (4th Dim.)		£14.45	£16.98
Holed Out Designer (4th Dim.)		£14.45	£16.98
Holed Out Vol. 1 or 2 (4th Dim.)		£12.75	£14.98
Hostages (Superior)		£14.45	£16.98
Iron Lord (Cygnus)		£14.45	£16.98
Inertia (4th Dim.)		£14.45	£16.98
Interdictor 2 (Clares)		£26.00	£30.55
Lemmings (Krisalis)	**NEW**	£19.00	£22.33
Mad Professor Mariarti (Krisalis)		£14.45	£16.98
Manchester Utd. (Krisalis)		£19.00	£22.33
Manchester Utd. Europe (Krisalis)	**NEW**	£19.00	£22.33
Master Break (Superior)		£14.45	£16.98
Microdrive 3D USA Courses		£10.45	£12.28
Microdrive 3D European Co.	**NEW**	£10.45	£12.28
Mig-29 Fulcrum (Domark)	**NEW**	£29.00	£34.08
Minipack 5 (C.I.S.)		£23.95	£28.14
Nevryon (4th Dim.)		£14.45	£16.98
No Excuses (Arcana)		£14.45	£16.98
Poizone (Eterna)	**NEW**	£14.45	£16.98
Powerband V. II (4th Dim.)		£18.00	£21.15
The Real McCoy 1 or 2 (4th Dim.)		£21.50	£25.26
Turtles Tour the World (E. Crayon)		£14.45	£16.98
Twin World (Cygnus)		£14.45	£16.98
Saloon Cars (4th Dim.)	**NEW**	£18.00	£21.15
Speech (Superior)		£14.45	£16.98
Wimp Game (4th Dim.)		£14.45	£16.98
World Champ. Boxing Man. (Krisalis)		£19.00	£22.33
World Champ. Squash (Krisalis)	**NEW**	£19.00	£22.33
Wonderland (Virgin)		£24.50	£25.79
Zelanites (MicroPower)	**NEW**	£18.00	£21.15

Please ring for current prices on software NOT listed here

Monitors

Description	Ex. VAT	Inc. VAT
Acorn Colour Monitor (AKF17)	£200.00	£235.00
Philips CM8833 II Colour Monitor	£209.00	£245.58
Microvitec CUB 3000	£199.00	£233.83
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Update

New budget label

A NEW label has hit the educational software scene in the form of Rainbow Software, launched by Fastback Software (0392 77369). "We saw a gap in the market with too many educational software publishers trying to sell expensive but inadequate software", said Rainbow's Martin Currey. "We concentrate on quality software at the right price.

"At first we restricted our programs to the ST and Amiga but we now intend to bring them all out for Archimedes machines as well. At £9.99 they will be really good value for money".

Next package from Rainbow will be Telling The Time which teaches both analogue and digital time reading on 12 and 24 hour clocks with the help of colourful character Bobby the Clown. It is aimed at children aged from three to 12.

Archimedes versions of Rainbow's first two packages, Shapes & Colours and First Letters, are also due out soon. Shapes & Colours includes a selection of games to help children learn shapes, sizes, differences, similarities and grouping.

First Letters takes children on a tour of Bobby's house where he points out up a 100 different objects for which the first letter must be identifies. Both packages are for the under-fives.

Software wins toy award

SIX of its packages have won Sherston Software (0666 840433) a silver award in the 1991 What Toy awards. Winning titles were Animated Alphabet, Animated Numbers, Connections, Space Mission Mada, Teddy Bears' Picnic and Toby at the Seaside.

After three months of appraisal by parents and children, they were selected by the Play Matters Advisory Panel in the awards organised by What Toy magazine. The prizes were presented by TV personality Desmond Wilcox at a lunch at the Carlton Tower Hotel, London.

"We were delighted to have won awards the very first time we submitted our programs to What Toy", said Bill Bonham of Sherston. "Considering other award winners included companies like Lego, Fisher Price, John Adams and Little Tikes, we were honoured to get a silver award for the best educational toys of 1991".

Master and the Bible

WITH its Bible Story graphics range of videos, The Bible Society (0793 513713) aims to bring Bible stories to life for young children of the computer age.

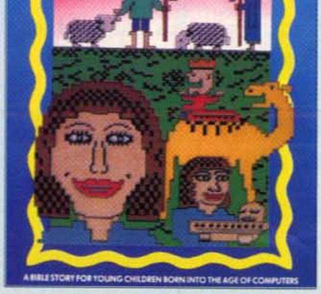
Latest in the range, The Christmas Story, was created using an Acorn Master 128 with music from an EMR Midi system connected to a Technics music keyboard.

Author is Dr.Bill Geer who uses computers extensively in his work as a chartered mechanical engineer and is also a lay reader at his local Anglican church in Hughenden, High Wycombe.

The Christmas Story promotes a wide range of support activities to give both parents and Sunday School teachers different activities for children at Christmas. Youngsters can tell the story themselves while watching the pictures, join in songs and take part in group activities and games.

Aimed at three to seven-year-olds, it costs £14.95.

She wrapped him in strips of cloth and laid him in a manger full of hay


BIBLE STORYGRAPHICS
THE
CHRISTMAS
STORY
With Activities
A BIBLE STORY FOR YOUNG CHILDREN BORN INTO THE AGE OF COMPUTERS

French on the Arc

ARCHIMEDES owners wanting to take advantage of LCL's acclaimed Micro French course have previously had to pay full price for the BBC Compact version and use it with an emulator, even though they knew that not all the programs would run.

In response to their plight, LCL are to bring out full Archimedes versions of both Micro French and Micro English allowing Arc students to run all 24 programs of each course.

Micro French teaches both spoken and written French, starting from the very beginning and progressing up to GCSE level. It covers verbs, grammar, vocabulary and the spoken word.

Verbs and grammar programs are intensive and include sophisticated error handling while vocabulary and spoken French are fun, based on games, puzzles and pictures.

Serious and fun programs are alternated to promote better concentration and motivation.

Micro English is for eight-year-olds up to GCSE level and covers reading, writing and oral communication. Both elementary and advanced spelling are taught and tested as part of the writing section

➤

Learning at play

A NEW collection of National Curriculum Maths and English games for five to nine-year-olds has been produced by HS Software (0792 204519).

Called Fun and Games, it includes three games which have been designed to make full use of the sound and graphics capabilities of Archimedes and A3000 computers.

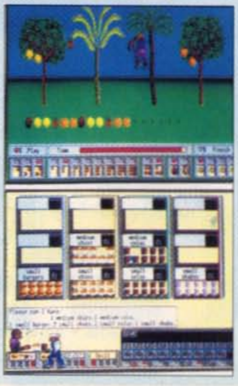
Full colour Mode 15 graphics with digitised pictures, arcade quality animations and extensive use of digitised speech are among the features.

To help children with sequencing and devising and repeating patterns, Coconuts challenges them to pick different fruits from a variety of trees and complete onscreen patterns.

In Burger Boy they must make up orders in a busy burger bar from a choice of burgers, chips, drinks and other food. Skills taught include reading, matching, sequencing, auditory and visual memory and addition.

Third game is Tidy in which youngsters must help Emma tidy her bedroom with the aid of her pet parrot. It covers early reading, comparing objects and use of prepositions.

Fun and Games costs £19.95.



with 100 words which can be changed to suit the pupil or teacher.

Courses are normally £1 for each of the 24 programs, but special offers are available if more than one course is bought. Two cost £43, three are £62 and four £79.

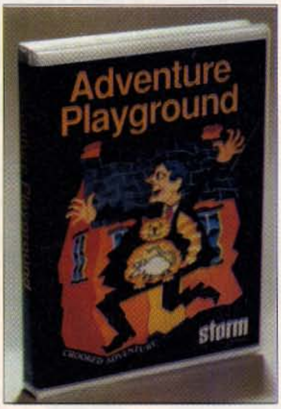
Logic in the playground

ADVENTURE Playground, the latest offering from Storm Software (0963 22469), features two explorations designed to teach planning, memory, spatial concepts, decision making, logical thinking and strategy.

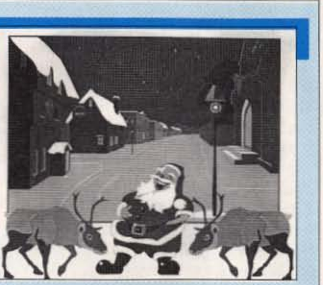
First is The Crooked Adventure based on the Crooked Man nursery rhyme. Children must get the crooked man with his crooked cat and mouse to his crooked house in four games which follow the scenes of the traditional rhyme.

In the second adventure children must help the Queen of Hearts to find her tarts, searching a number of locations including the bears house, Mary's garden and the toy box while overcoming a number of obstacles.

Adventure Playground is for four to eight-year-olds. The BBC package costs £19.49. Archimedes and A3000, including Concept keyboard, versions cost £19.99. Colour overlays are available.



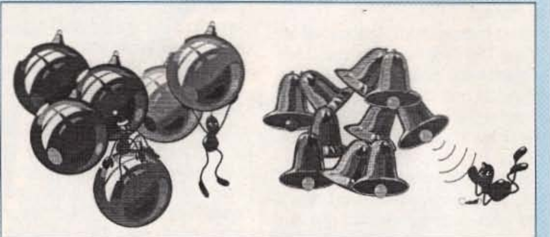
Festive files



CHRISTMAS is coming and Sherston Software (0666 840433) have announced a collection of 70 colourful draw files on the Yuletide theme for Archimedes and A3000 users.

In addition to the usual illustrations of reindeer and sleighs, the Christmas Allsorts package includes toys, food, drink, decorations, greetings and many other images needed to create Christmas designs.

Also included are a tutorial disc, a series of activity cards and a 24 page booklet on how to use !Draw. Price, £16.95 plus VAT.



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for the under 5s

Under 5s

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Pair the large letters at the alphabet fair

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for 5 to 7 year olds

5 to 7s

Tell the time and watch the clock come alive!

Guide the frog from log to log to solve the sums

fun school 3
for the over 7s

Over 7s

My desc is at the front of the class. I sit next to Emma.

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Product: Resource Packs
Price: £13.95 each
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH,
Tel: 0666 840433

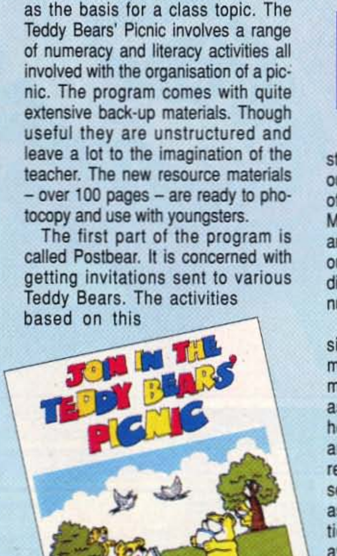
SHERSTON Software will hardly need any introduction to teachers – particularly those with children under 14 years. Their programs are well known, well produced, error free, colourful and totally reliable. More importantly, they have relevance to the youngsters who use them and – in these changing times – can easily be used with the National Curriculum.

Three of their packages are: Teddy Bears' Picnic – for five to seven year olds; The Farm – aimed at middle infants; and The Nature Park Adventure – for lower juniors. Now Geoff and Sue Smith have compiled a set of pupil resource materials for each of these packages.

Their aim is to ease the burden on teachers trying to cope with the complexities of the National Curriculum. A point to note here is that the Smiths work in Australia and from time to time these materials have a down-under flavour. This is hardly likely to bother our youngsters, brought up on a staple diet of *Neighbours* and *Home and Away*.

Each of the programs can be used as the basis for a class topic. The Teddy Bears' Picnic involves a range of numeracy and literacy activities all involved with the organisation of a picnic. The program comes with quite extensive back-up materials. Though useful they are unstructured and leave a lot to the imagination of the teacher. The new resource materials – over 100 pages – are ready to photocopy and use with youngsters.

The first part of the program is called Postbear. It is concerned with getting invitations sent to various Teddy Bears. The activities based on this start at a very simple level – cutting out a stamp and putting it on a letter of invitation and matching numerals. More advanced pupils could address an envelope and get involved in various counting activities. This includes differentiating between odd and even numbers.



There are also simple comprehension exercises, word searches and mazes. Level three activities involve matching number names to numerals, as well as more advanced comprehension activities. The work on odd and even numbers is based on the results of simple computations. This section of the new materials ends – as do all of its parts – with suggestions for teachers on related tasks away from the computer, the worksheets and the classroom.

The next part of the program is concerned with making the sandwiches for the picnic – a sort of sequencing activity. The new resource materials once again have three levels, to match those of the program. Level one activities are concerned with simple visual discrimination and basic sequencing.

At level two a simple comprehension exercise is introduced along with a very elementary crossword and some jumbled words. Level three tasks are more complex and introduce some number work as well. All of the worksheets are easy for children to relate to and the font used is clear, bold and simple. Drawings are simple and the language level appropriate to the expected age and ability range.

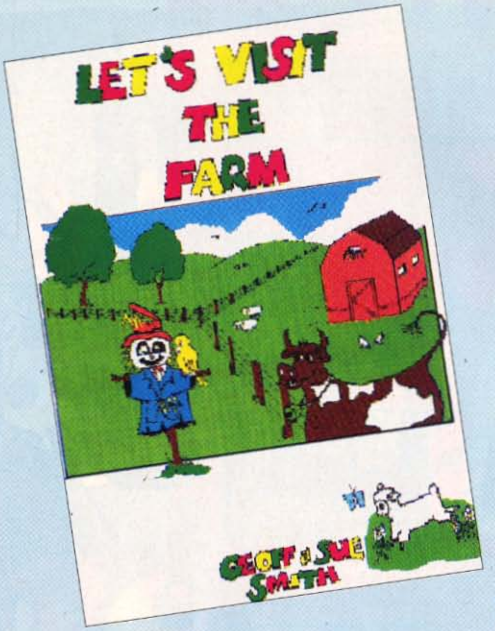
Next comes The Oak Tree. On screen a squirrel drops an acorn which grows into a huge tree. A bear hides behind it and by asking questions about his clothes he can be identified.

Some first rate activities are provided to link with this section. At level one, the growth of an oak tree can be sequenced pictorially. Level two has a similar activity but introduces words as well. There are also visual and reading comprehension exercises. At level three some quite advanced skills are needed – for instance, colouring the clothes of nine bears so that they are all different, with only three colours allowed. Various word searches, jumbled word games and rhyming word games are also included.

The Teatime part of the program involves moving some plates of food to the correct spots and then dividing cakes or sandwiches among a couple of bears. The aim is to reinforce notions of odd and even numbers.

The resource pack contains similar activities, again at three graded levels including colouring and matching, counting and simple sharing. There are also some word based Cloze tasks.

A Walk in The Woods involves finding objects and deciding what to do with them – no marks for stamping on spiders. The aim is to reach the see-



STUDYING NATURE PA
ADVENTUR
GEOFF & SUE SMITH

saw and the new resources make use of balancing.

Work cards are provided for balancing numbers and objects. Others allow youngsters to divide objects into sets according to suggestions given to them or to their own ideas.

The last part of the program Edward Bear's Practice is pure and simple sums. Various work cards are provided to extend this.

The final part of the resource book deals with related activities. This includes making teddy bears and masks, using a grid to copy pictures both bigger and smaller and dot to dot pictures. There is a section on compound words – like see-saw – and others deal with baby animal names and animal sounds, homes and ways of moving.

There are information cards on different types of bear – including Koala and Panda which the authors acknowledge aren't true bears – and finally work on trees and famous bears.

Overall, this is a superb pack. For the materials it provides its price is tiny. There is no requirement to have the program since all the activities stand alone. The only point to note is that the levels in the resources are not National Curriculum levels. They refer to the different skill options in each program.

In a review of limited length I have decided to concentrate on one of the three resource packs. The materials for The Farm and Nature Park Adventure do rely more on the software, but they maintain the same high standard of Teddy Bears' Picnic. The tasks are, of course, based on those within the programs. The Farm pack is thus fairly factual while Nature Park has more scope for imagination and fantasy. They are also based on the expected age range. So the language level of Studying the Nature Park Adventure is appropriate to nine year olds. Both represent superb value for money.

Summing up

Sherston have produced real winners with these resource packs. By using them teachers can use professionally produced materials designed with their pupils in mind. If you use the programs these packs are a must. If you don't, they are still useful.

A sleuthing we will go

Shelley Birchenough picks up her magnifying glass and joins Shylock Gnomes

AFTER taking us on the trail of the Little Red Riding Hood, Selective now plan to entice children with a reading age of 10 plus to join the entourage of Shylock Gnomes.

An adventure game for school or home it can be used on an individual basis or with a group of children – indeed some of the puzzles are probably best solved within a small group.

The packaging with Shylock is simply an A4 booklet. This includes two telegrams which have been sent to Shylock, some case notes and a newspaper page outlining the baffling disappearance of that ace detective Shylock Gnomes.

These materials can be distributed to give a class a feel for the adventure, while the bulk of the documentation is help for teacher or parent – The Busy Teacher's Guide Through the Castle, being especially useful as although there is a save option there is no restore function.

To give you a brief description of what is going on, the legendary Crystals of Chaos have been stolen and reports have been circulating that these have appeared in Transylvania. After receiving two telegrams Shylock rushes over to that vampire-ridden realm.

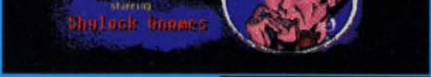
Product: Shylock Gnomes in the case of The Transylvanian Terror!
Price: £18.50
Supplier: Selective Software, 64 Brooks Road, Street, Somerset BA16 0PP.
Tel: 0458 43079
Requirements: BBC A3000 or Archimedes series

Igor will happily show you into the castle and you are left alone to explore. The interface is easy to use if a little clumsy and does completely take over your Archimedes. By *looking* around you'll find objects to help, but there is a limit to the number which can be carried.

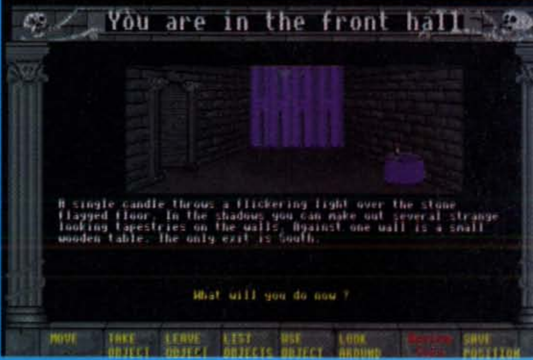
The directions you can travel in are shown at the bottom of the screen and mapping is a very good idea as well as a useful skill to learn at any age. If you have problems a map is supplied.

Looking in the right places will reveal puzzles which guard the crystals. After you have discovered 12 of them Dracula will set the final puzzle. Even adults will not be able to do this the first time, therefore an option is given to leave the game at this stage and re-enter later via a password when the puzzle is solved. This is very useful as the problem can then be contemplated away from the computer.

The puzzles can be ➤



The atmospheric opening screen

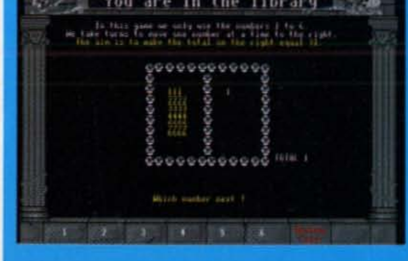


You are in the front hall.

A single candle throws a flickering light over the stone flagged floor. In the shadows you can make out several strange looking tapestries on the walls. Against one wall is a small wooden table. The only exit is South.

What will you do now ?

Exploring the castle



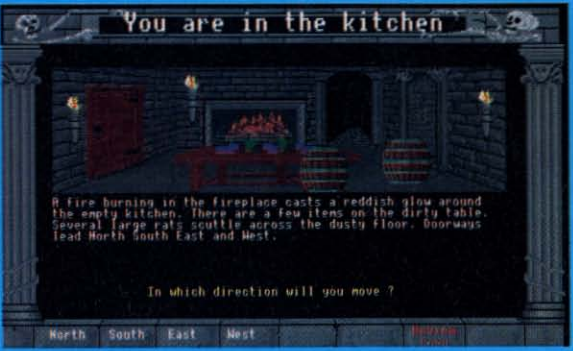
You are in the library

One of the puzzles

divided into four sections: Mathematics, Science, English and Creative. These are challenging in themselves but can also lead on to some interesting non-computer related activities some of which are selected within the documentation. As you would expect Attainment Targets are given in the manual under each subject heading. There is also a resource list of music, fiction, reference and poetry which can be incorporated too if you want.

The program uses music – Bach's D minor Toccata – to good effect at the beginning but I have heard better renditions on the Archimedes. You are then taken through an atmospheric opening sequence.

There is a lot of humour in the program and the graphics and style is very similar to Little Red Riding Hood. Children can go through the screens at their own rate, clicking on *Go on* as appropriate. The usual options on show are: Move, take object, leave object, list objects, use object, look around and save position.



A fire burning in the fireplace casts a reddish glow around the empty kitchen. There are a few items on the dirty table. Several large rats scuttle across the dusty floor. Doorways lead North South East and West.

In which direction will you move ?

Further exploration

The pointer becomes a detective's magnifying glass and choosing an option will often lead to a sub-menu the options of which are again chosen with the mouse. This is usually true for the puzzles you encounter – although some do require numbers to be typed in.

The puzzles are clever and some are definitely old chestnuts. This does not make them easy to solve unless you grasp the principle involved. I would certainly advise teachers or parents to adventure before letting the children loose.

As you look around you are given a running total of the number of the crystals found so far and you'll discover friendly ghosts and tricky skeletons too.

The first crystal my group successfully acquired was in the kitchen. The puzzle was a simple mathematical one. On screen is a recipe with some of the figures obscured. You must input the missing numbers to make a given total. You must however keep to the figures given because if you get the right total but don't use the original figures you'll end up in the dungeon.

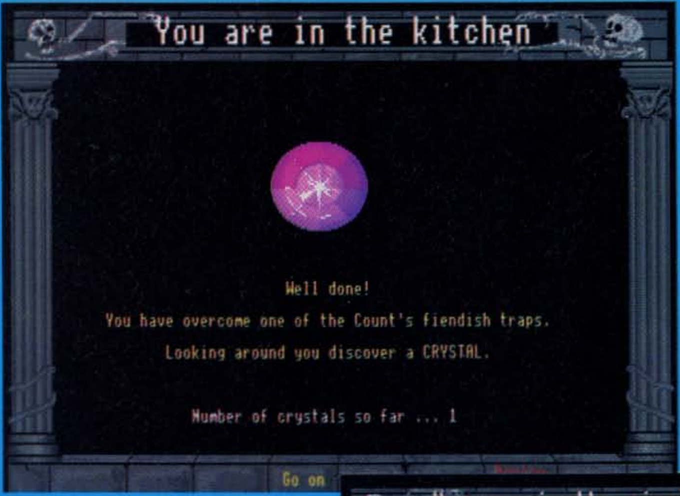
This is where you'll find yourself whenever you get a puzzle wrong. It is actually situated at the end of a long tunnel which I found later on. But there is only one way out – through a sliding castle wall. And, as you'd expect, a puzzle guards the way. It is simple to solve and returns you to a random downstairs room.

It is here that I found a slight glitch. You have the option to quit at this point. Choose quit and you are asked to confirm your choice. However, should you opt for yes or no you still end up at the beginning of the puzzle sequence.

In fact the only way I found of quitting was to save a position then I was offered the starting choice of instructions, loading a saved position, starting the adventure or quitting.

One other small niggle I have is with the keys. For instance should you journey through a secret door which requires a key you must use this on the door. However, if you drop the key behind the open door to return the way you came you'll find that you no longer have the key and that the entrance is now closed and you'll have no option but to start again.

My final criticism is that the program didn't like the IDEFS drive at all which, if not unusual, is still aggravating and potentially serious to non-technical teachers.



Well done!

You have overcome one of the Count's fiendish traps.

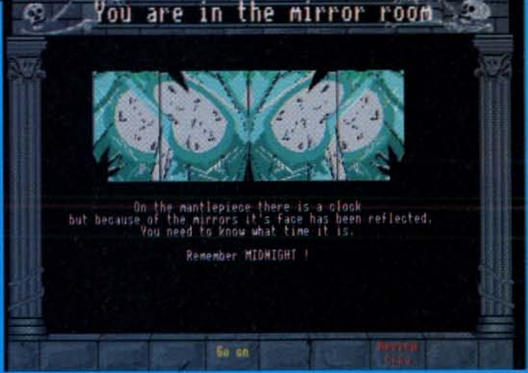
Looking around you discover a CRYSTAL.

Number of crystals so far ... 1

A step in the right direction

You are in the crypt

Another devilish puzzle



On the mantlepiece there is a clock
but because of the mirrors it's face has been reflected.
You need to know what time it is.

Remember MIDNIGHT !

Mirror mirror on the wall

Summing up

Despite these very minor niggles, Shylock Gnomes is an excellent and fun program in its own right – the educational side is a bonus. It really grabbed my children and led on to a range of other work.

It requires good logic and a methodical approach as do all adventures and deserves to be a classroom classic. I look forward to any new Shylock escapades.

Don't you open that trapdoor

Rog Frost enters the adventurous world of Sellardore

Product: Sellardore Tales
Price: £24.00
Supplier: Sherston Software, Swan Barton, Sherston, Malmesbury, Wiltshire SN16 0LH.
Tel: 0666 840433
Requirements: BBC B, B+, Master, Compact, A3000 and Archimedes range

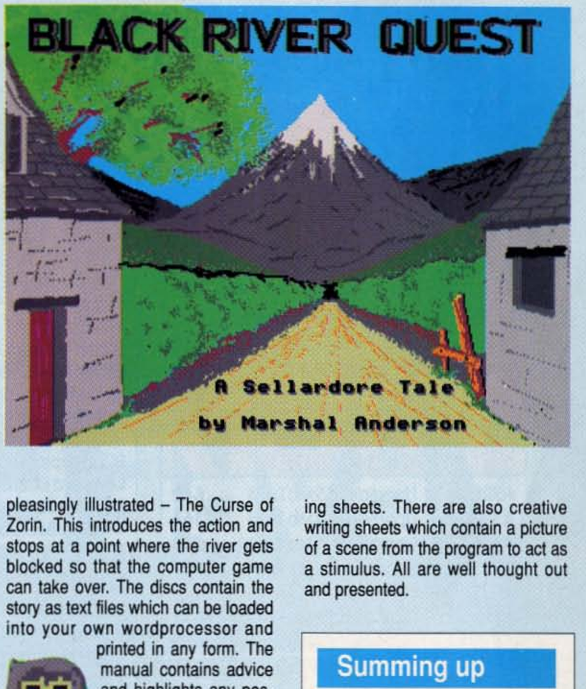
SELLARDORE Tales sits firmly in the adventure game category. What makes this one different is that the language used in the program has been assessed for reading age by the Mugford system at about eight and a quarter. The program claims to have an older interest age, so is aimed at pupils of 10 and above who have reading difficulties.

The problem you must solve centres around a blocked river. A dam must be blown sky high so that water can again flow through Black River Village. In true adventure style, problems are encountered on the journey. A lamp is needed to get through the cave which contains a hungry and obstructive dragon. Water will be needed to cope with a room fire while keys and magic spells all find their uses.

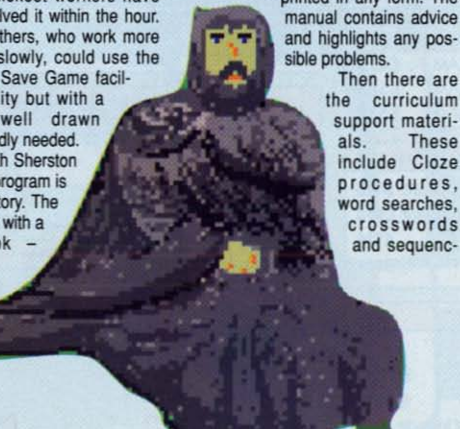
All puzzles are entirely logical and consistent. None are too difficult and can be solved by most youngsters. The route through the program is simple, with no frustrating mazes to delay you. The graphics are good, bold and clear although teachers may select the graphics-free large text version. The total map is fairly small with less than 40 locations but most users will find a need to record things as they go along. In short, the program is just what an adventure program should be.

I don't, however, suggest that experienced adventure gamers should rush after Sellardore Tales. It's aimed at youngsters with limited literacy skills and this means that room descriptions are cut to the bone. The puzzles, too, are of a fairly elementary nature and so suitable for the intended audience.

Within my own secondary school, the program has been used by pupils of many ages. Apart from our own appropriate youngsters, visiting primary pupils have experienced the Black River. So too have 16 year old Germans on an exchange. The latter, who have had a massive one hour time allocation, have gained a lot of pleasure from the program and the quickest workers have solved it within the hour. Others, who work more slowly, could use the Save Game facility but with a well drawn map this is hardly needed.



As usual with Sherston products, the program is only half the story. The package starts with a reading book – pleasingly illustrated – The Curse of Zorin. This introduces the action and stops at a point where the river gets blocked so that the computer game can take over. The discs contain the story as text files which can be loaded into your own wordprocessor and printed in any form. The manual contains advice and highlights any possible problems.



Then there are the curriculum support materials. These include Cloze procedures, word searches, crosswords and sequencing sheets. There are also creative writing sheets which contain a picture of a scene from the program to act as a stimulus. All are well thought out and presented.

Summing up

Archimedes users have a number of advantages over their BBC counterparts although essentially the game is identical. Perhaps best is that the location graphics are ordinary sprites. These can be used in a DTP package when producing extra resources. They can also be modified, using !Paint, to suit particular users. There is something about this program that seems to encourage this kind of experimentation.

Sellardore Tales is highly recommended. It fulfils its own aims but also finds applications across the curriculum. Well done Sherston. This is a real grade A product.

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Will you Gehen a la Supermercado?

An appetising combination? Ian Dickinson investigates a four-language look at continental shopping

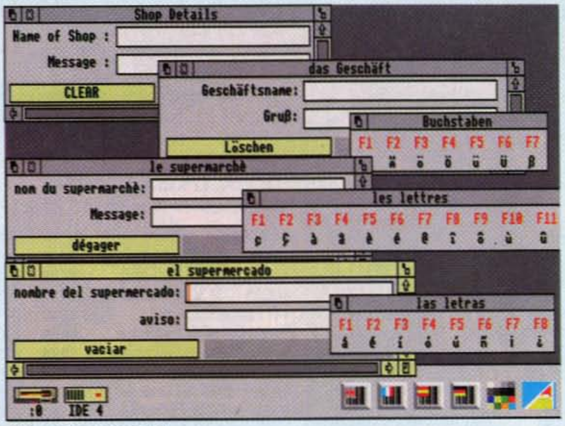
Product: Supermarket
Price: £10-£34
Supplier: New Era Software, 204 High Street, Woodville, Burton on Trent DE11 7DT.
Tel: 0283 12818
Requirements: BBC A3000 and Archimedes range

OCCASIONALLY a program comes along that you either don't use at all, or you find so many different uses for it that it's difficult to put down.

Supermarket has arrived and is ready to go through the curriculum mill. If you are feeling in a G7 mood or fancy a touch of continentalism you may opt for Supermarche, Supermarkt or Supermercado. The program is available in a total of four different languages – providing a flexible and useful addition to the software library.

So, what does this program do? Very simply it simulates a supermarket till. It does this effectively, and is simplicity itself to operate.

A group of 10-year-olds tested the English version and had no difficulty in understanding what was expected in order to use the program and they were very impressed with their printed till receipts. It also has a variety of other useful features making it a realistic simulation. For example, payment can be made by cash, cheque, Access or Visa. Amounts tendered are entered, and change is automatically calculated – so customers should get the correct amount.


Shop Details
Name of Shop :
Message :
CLEAR
das Geschäft
Geschäftsname:
Gruß:
Löschen
Buchstaben
F1 F2 F3 F4 F5 F6 F7
ä ö Ö ü Ü ß
le supermarchè
nom du supermarchè:
Message:
dégager
les lettres
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 F11
ç Ç à â è é ê î ô ù û
el supermercado
nombre del supermercado:
aviso:
vaciar
las letras
F1 F2 F3 F4 F5 F6 F7 F8
á é í ó ú ñ ¡ ¿
:0
IDE 4

All four languages loaded

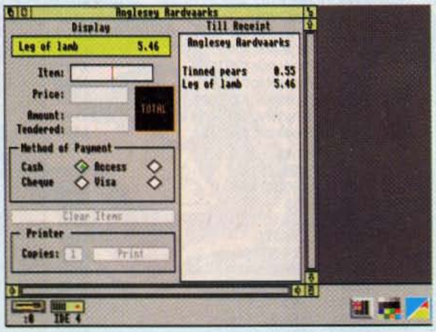
You can put your own shop name and message on receipts which gives a good sense of realism and ownership. All products and prices are entered via the keyboard and a full list of items is printed out on the receipts. Barcodes can also be entered into the system.

Given the fact that Supermarket is available in a total of four languages it has tremendous scope for use in the classroom. I am a firm believer that any piece of software is only limited by imagination and Supermarket can certainly be put to good use in many areas of the curriculum with a wide age and ability spectrum. It can even be used in real situations including tuckshops, enterprise projects or in any situation where a till and receipt is required. Project work and all the other related topics and skills required can easily be introduced.

Summing up

Documentation is simple, well written and even better, there's not much of it, because you don't need it. There is no flashy, glossy manual and this helps keep the cost down. The software is inexpensive and includes a site licence. At this price it's worth buying the full language suite.

Supermarket can either be used as the hub of a project, or related to another topic under investigation. Need I say more? I think not. Please call again.


Anglesey Aardvaarks
Display
Till Receipt
Item:
Price:
TOTAL
Amount:
Tendered:
Method of Payment
Clear Items
Printer
Print
:0
IDE 4

Leg of lamb 5.46

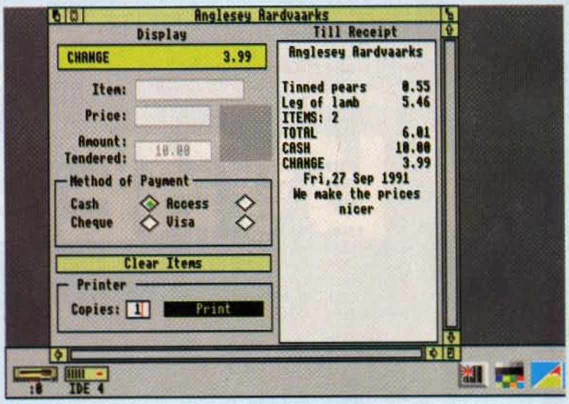
Cash ◇ Access ◇
Cheque ◇ Visa ◇

Copies: 1

```
Anglesey Aardvaarks

Tinned pears     0.55
Leg of lamb      5.46
```

Using the till


Anglesey Aardvaarks
Display
Till Receipt
Item:
Price:
Amount:
Tendered:
Method of Payment
Clear Items
Printer
Print
:0
IDE 4

CHANGE 3.99

Amount: Tendered: 10.00

Cash ◇ Access ◇
Cheque ◇ Visa ◇

Copies: 1

```
Anglesey Aardvarks

Tinned pears     0.55
Leg of lamb      5.46
ITEMS: 2
TOTAL            6.01
CASH            10.00
CHANGE           3.99
  Fri,27 Sep 1991
 We make the prices
       nicer
```

The final receipt

Putting on the ram

Paul Hendy examines a new enhancement for his A400 – with some interesting results

IT seems like only yesterday that people were saying that 32k for the BBC Model B was a large amount of ram, more than enough for most purposes. Now programs are so complex that computers require more and more memory.

Or perhaps the converse is true, and computers with large memories encourage programs that require large memories.

Whatever the reality, the 4Mb limit of the Archimedes is rapidly becoming a barrier to further development, and companies are rushing to provide upgrades.

Watford Electronics, a well-respected supplier of add-ons for the Beeb and Arc market, has produced a 4Mb board, capable of being fitted with a companion ARM3 processor upgrade. The unit comes with a small A5 stapled leaflet which, incidentally, needs revision as it contains some errors.

The main upgrade board is very well designed and constructed to the normal high Watford standard, with the memory modules mounted on the non-component side.

Though this looked rather odd, it enabled the board to be fitted in the slightly cramped area in front of the podule rack and underneath/behind the disc drives.

The board has an edge connector on to which is fitted either an ARM2 or ARM3 board. This was my first disappointment. To review this board I was going to have to remove my ARM3 processor and adjust to the slower speed.

When you buy the Arcram 480 you can exchange your Watford ARM3 board, if you have one, for a compatible one.

The booklet rather understates the situation when it advises that *the upgrade is not particularly difficult to perform.*

You need to have strong nerves and a lot of patience to get it right, and if you are in the least bit unsure my recommendation is to get a supplier to fit it. Let them risk breaking the chips and having to replace them.

Two ICs have to be removed from the Acorn motherboard – the MEMC and ARM chips – and placed on the main or ARM2 board. These are not normal ICs, and a special tool extractor is supplied which proved useless at removing them from their special sockets.

I tried two extractors and both failed to grasp the chips properly, causing one chip to be scratched badly but fortunately not damaged, and the other to be removed using a different set of tools.

The computer cover was taken off and then both the floppy and hard disc drives removed. Do be careful not to jolt the read-write heads. The ICs were located and removed, and then – it felt like several years later – replaced in their new sockets. This has to be done with great care to ensure that they are placed the correct way round and that you do not touch any of the metal legs, possibly causing either a static discharge or a poor contact.

Watford Electronics advise that the installation be done with the computer plugged in but turned off, thus providing a source to earth to avoid static – and that is good advice.

Product: Arcram 480
Price: £499
Supplier: Watford Electronics, 250 High Street, Watford WD1 2AN.
Tel: 0923 37774
Requirements: Archimedes 400/1 series

The floppy disc cable has to be replaced with a longer one, but this was missing from the review pack, so installation stopped for a day until it arrived.

On examination it didn't match the cable drawn in the leaflet, depicted and described as being in two parts. However a call to the W.E. technical department assured me that it would work.

The extra lead length is needed to travel behind and round the upgrade board to the disc drive.

In the front corner of the interior is a grounding wire which the leaflet says must be re-routed round the front of the drive mounting bracket. I decided I was not going to try that, and if you are careful the board will still fit.

Two connecting spacer blocks on the upgrade board locate in the two vacant IC sockets on the motherboard, and with a lot of firm pressure they will lock into place.

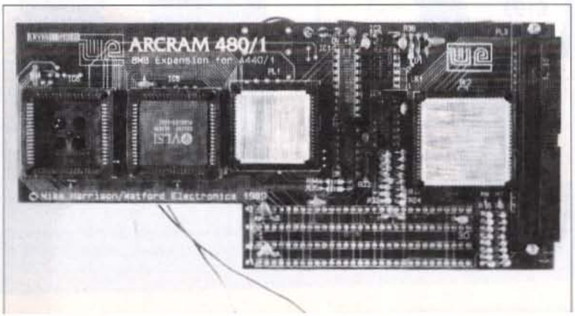
It is very difficult to check that all is correct because everything conspires against you examining it. The leaflet advises peering through one of the podule slots from the back, or using a mirror.

When I finally felt that it had to be right I attached the red and black power connectors. The leaflet stated that these should be connected to the tags on the Archimedes main board, but the only ones I could find that would fit were on the podule rack, and as these provided the correct voltages they were used.

The machine was switched on and almost immediately an error appeared concerning 'Address exception'. This was exactly as predicted in the booklet and a fix is provided.

The various programs were copied from the disc supplied, a change made to the !Boot file, and finally everything worked.

All the programs I tested appeared to work perfectly – except, surprisingly, when printing from Impression II version 2.13. This loaded as normal, but when I tried to print something the machine locked up completely and needed a reset. The only way I could get anything to print was by switching off the upgrade board using the *FOURMEG command supplied.



A variety of printer drivers were tried, including the Laser-Direct and all exhibited the same problem.

Watford suggested that it was an Impression problem, but a phone call to Computer Concepts assured me that they had heard of no such problem with their program.

Having used Impression almost from the day of its launch I have never experienced incompatibility problems with it before, but on my machine there did appear to be a clash somewhere between the upgrade board and the DTP package.

I tried doing a complete reset holding the R key down while switching on with no extra add-ons, podules or programs running and then immediately loading Impression. A one-line document was prepared and printing attempted, but the error persisted.

There was no problem printing from !Draw in 8Mb mode so clearly there is a compatibility problem that needs to be addressed.

It may be something as simple as the particular software version, but it is another reason for having the installation done by a dealer so that it can be checked with your particular configuration.

A lot of rubbish has been written in the press about overheating and power-loading problems with the Watford board.

This review copy was tested with temperature probes and current measuring instruments. No excessive heat or current drain was detected and the board should cause no problems whatsoever.

Summing up

I have strong reservations about an inexperienced person being advised to perform this upgrade. If possible get a dealer – preferably Watford themselves – to fit and test it. And make sure that the printer works from your software.

The extra memory is invaluable if you are running a lot of programs or writing very long documents, particularly if you are maintaining more than one document in memory at the same time.

All in all the board can be recommended as a most worthwhile upgrade.

Archimedes Hardware & Software

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SYSTEMS LTD

Arxe Systems Ltd, P.O.Box 898 Dept AW1, London, E7 9RG
Telephone : 081 534 1198

E & OE

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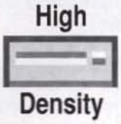

High Density Interface

This new interface replaces the standard 3.5" internal drive system with a new 2MB high density drive and controller card. A new disc filer provides support for a 1.6MB high density disc format, as well as providing full compatibility with the existing ADFS formats.

Price : £199 Availability : October 1991

MultiFS 2

New version of MultiFS with support for high density PC discs. New formats supported include 1.44MB and 1.2MB. In order to use this program the user must have the HDI card fitted.

Price : £42.50 Availability : October 1991

MOV r
MOV r
SUB r
SWI XOS_

ProDis

Is the professional desktop dissassembler for the Archimedes. Ideal for both the novice and experienced user. Contains many innovative and useful features such as user colour coding of instructions, support for all ARM assembler instructions and the dynamic allocation of memory to cater for programs of all sizes.

Price : £25.49 Availability : September 1991

SCSI Hard Discs

We now offer a comprehensive range of SCSI hard discs at excellent prices. The list shown gives prices for some of the range we currently stock. The drives listed are all internal 3.5" half height models. For external drives (cased with PSU) please add £80 to the listed price.

Model	Capacity	Price
ST125N	21.5MB	£199
ST138N	32.2MB	£213
ST157N	48.6MB	£236
ST177N	60.8MB	£313
ST1096N	83.9MB	£342
ST1133N	113.4MB	£516
ST1186N	158.8MB	£565
ST1201N	171.9MB	£570
ST1239	204.2MB	£610

Removal SCSI Drives

Syquest Drive + 1 Cartridge	£499
Spare Cartridges (42MB)	£79

Interfaces

Acorn SCSI card	£239
Lingenuity 16 bit SCSI card	£199
Serial Port 16 bit SCSI card	£149
Serial Port 8 bit SCSI card	£99

Monitors

AOC Multisync colour monitor	£295
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Desktop Publishing

Acorn Desktop Publisher	£108.00
Equasor	£49.00
Fonts	
Newhall	£39.00
Starter	£39.00
Symbol	£39.00
Impression 2 (Ver 2.13)	£132.00
Impression Business Supplement	£49.00
Impression Junior	£72.00
Ovation	£95.00
Poster	£78.00
ShowPage	£130.00

Word Processing

Easi Writer	£140.00
First Word Plus (Rel 2)	£68.00
Impression 2 (Ver 2.10)	£132.00
Impression Junior	£72.00
Pipedream 3	£110.00
Protext (Ver 5)	£114.00

Graphics

ArcLight	£38.00
Artisan 2	£44.00
Atelier	£72.00
Euclid 2	£46.00
Font FX	£8.00
HotLink Presenter	£43.00
Mogul	£15.00
Pro Artisan	£73.00
Render Bender 2	£120.00
Revelation	£66.00
Snippet	£29.00
Tracer	£46.00

Music/Sounds

Armadeus	£59.00
Articulate	£19.00
Rhapsody(New Version)	£47.00
Superior Speech	£15.00
Tracker	£38.00

New Releases

Acorn Desktop Assembler	£199.00
Acorn Desktop C (DDE)	£245.00
Genesis II	£99.00
Investigator 2	£21.00
Junior Database	£51.00
MultiFS v1.45	£30.64
PC Emulator v1.6 (Runs in a Window)	£87.00
Touch Type	£41.00

Games & Adventures

Alice In Wonderland		£25.00
Bambuzle	(NEW)	£16.98
Blaston		£15.00
Blitz!	(NEW)	£21.23
BlowPipe		£15.00
Boogie Buggy		£19.00
Break 147 & Super Pool	(NEW)	£19.00
Chess 3D		£19.00
Chocks Away(Mk2)		£19.00
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All prices exclude VAT (@17.5%). Mainland UK postage free for software cash sales only. Hardware £10 per item. Overseas postage at cost. If you cannot see what you require please write or phone for availability and a copy of our comprehensive software catalogue.

All orders are processed immediately. However, delays can sometimes occur when suppliers are slow to deliver. We apologise for any inconvenience this may cause to our customers. *Please include contact telephone number for written orders.* Official orders welcome, payment due in 28

PUBLIC DOMAIN

Drop the Dead Duck

Ignoring the smoke and noise of bonfire night, Teri Paul rockets through the latest PD

WELL my prayers have been finally answered, not only has someone created a gunsight so I can annihilate my smug little DeskDuck, but I've also introduced him to Cyril the snail.

On a more serious note I have just checked out the specifications on the new Archimedes A5000. A very nice machine which has taken note of the PD market, too. By observing what are the more popular PD utilities, Acorn have been able to see what people want.

This means that programs such as PlaceIt and DrawPlus have had their features incorporated in the software of Risc OS 3. A utility called Pinboard has been added and !Draw is rewritten and enhanced.

But I think that it is a great shame that the original work of Ian Ashley and Jonathan Marten, among others, has not been credited, nor ever will be.

Therefore, I would like to thank – on behalf of the thousands of grateful users – all PD originators for giving their ideas, time and excellent programming skills all free of charge. If only Acorn could be as generous with their acknowledgements.

Seeing stars

There are an awful lot of demos around on the PD front and I am rather tired of stars, clever though parallax scrolling is. So it was a pleasant surprise when !Slide arrived in our offices from a couple of different sources this month.

Written by Andrew McLean and Adam Toon from Leicester this demo has the usual scrolling text but the screen is dominated by an interactive entertainment system. It features music which can be fast forwarded, stopped or paused plus a set of digitised pictures of such heroes as Michael Jackson and science fiction scenes.

Choosing one puts it into the large TV screen in the centre as well as into a small screen to the right which has a scramble icon. Highlight this and your large picture becomes a sliding block puzzle. All instructions are in the scroll text and the bank of small TV screens come alive, on cue, with animations and digitised scenes. Well programmed, interesting, original and showing off the power of the Arc. Brilliant.

Telstar PD's catalogue arrived this month. They use the Genesis II Browser to produce this, which is a very good idea. A pity about the spelling and cropped boxes though.

Games, games, games

Inundated with games this month, I methodically played my way through three versions of Pipemania and four of Tetris. Not to mention the different types of Breakout.

One of my favourites has to be Project RTP. Basically Tetris, the controls are easy to use and responsive and the graphics superb. It feels better than the original.

If you prefer a two-player game opt for George Styles' Whiptris. Again on the Archimedes, it's quite a decent game but I found the controls a little awkward. Actually this one is shareware.

Pypes is a working of the Pipemania theme which uses the mouse and enhances the original program in other ways too.

Mazes also seem very popular at the moment: EOR is a multi-tasking desktop one. You can alternate between heroes, collect the coins and leave the labyrinth. You can never see all the maze at once, though you can zoom in on the sprites themselves. Frustrating, but addictive.

Talking about shareware, Arxe Systems have just brought out Bambozle. The full version is a commercial game but it you prefer to try before you buy you can play the first two levels. I found this very simple game amazingly addictive and will probably *buy* the full version!

Richard Whicup has been busy with Alpine's Creator to produce Bomber, an old concept but an addictive one.

You fly over an urban landscape in a plane which is losing power and must land. To do so you have to create a runway by blasting buildings out of the way before you crash into them. Fun.

Finally, I was quite stunned to see a copy of !Meteors in a PD library. Not only is it a program copyrighted to ***The Micro User***, it also happens to have be written by the editor, Steve Turnbull.

Removing the REM statements does not do the same thing to the copyright – and don't think for a minute that people won't recognise their own code.

So to reiterate, magazine listings are copyrighted to the specific magazine they appeared in. If there are no REM statements and no copyright message don't distribute it – you could be breaking the law.

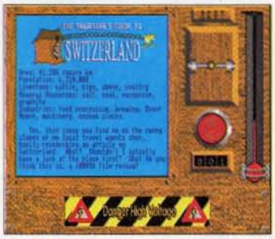
I recommend that PD libraries check their catalogues before someone gets really ratty.

Do you like anagrams? Well now you can create them using your Archimedes. Choosing from lexicons named Boring, Decent and Indecent, you type in your words, specifying certain criteria such as male, female, inanimate and so on and the program tries to create meaningful anagrams for you.

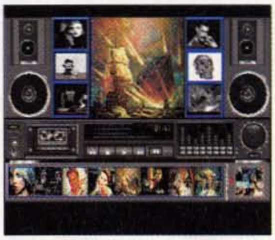
Written by W. Tunstall-Pedoe it's a powerful and interesting program.

On the utilities front Glyn Davies

➤



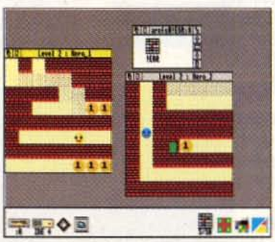
Lunchtime - informative and humourous



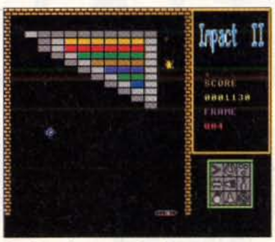
!Slide - a demo to take some beating

!DeskBalls
!Santa

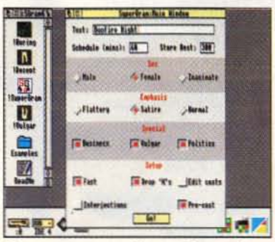
Some rather excellent bouncing balls



EOR - a simple but addictive maze game



Breakout, Impact or what?



Now you never need be stuck for words

has produced !ScrSave, a multi-tasking screen saver. After a time which you specify your screen goes black and a bouncing ball appears, the idea being to stop screen burn. Pressing a key or moving the mouse will return things to normal.

Lunchtime is a magazine. Not the computer variety, but one full of general interest articles just right for reading at lunchtime on your Archimedes. Do you want to know about H.P. Lovecraft or Switzerland?

The user interface and menuing systems are superb, easy to use and intuitive. If you want to know more contact: Dr. Doogie, 203 London Road, Chesterton, Newcastle, Staffs ST5 7HT with your £2.

Do you know if you are having a triple crisis day? No? Then load up Biorhythms immediately. This will plot your emotional, physical and intellectual curves for any given day.

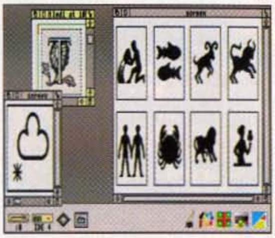
Unfortunately it doesn't tell you what to do when you get the results. Very popular in the early '80s, this is nice version.

Useful additions

A huge range of utilities are on the libraries' shelves at the moment. Here are a few which might solve your particular problem.

DirKiller 1.04 allows you to delete directories and the files within by bringing the directory to the dagger icon or the dagger icon to the directory – cute trick. And **SparkInfo** naturally enough provides a quick analysis of an archive created by Spark.

Fed up with the pointer being a simple arrow? Try customising your own with **Pointer**. And if you long for a dustbin on your desktop a la Mac, then there are a multitude to choose from. **Trash 1.14** lets you dump any file, but not directories, and recover the last one. However, if you leave the relevant application you won't find your garbage when you return.



Some of the best clip art around is PD

The monthly disc

You'll find most – if not all – of the Archimedes programs mentioned here on our subscription disc. All have been virus checked, and to squeeze on as much as possible we have archived the programs.

You'll find the latest version of ArcFS (read only) on the disc this month, if you are unsure how to unarchive the files, simply boot up the ReadMe file which will take you through the process step by step.

PD LIBRARIES

Do remember to always send an SAE when you write to any of the PD libraries – they can keep their costs down only if you help..

Abyss Software – Archimedes
35 Grantley Crescent
Kingswinford
Valley Fields
West Midlands
DY6 9EH

Arcaynia
PO Box 1927
Sutton Coldfield
B74 3YZ

ArchAngel – Archimedes
9 Chancel Court
Chancel Lane
Pinhoe
Exeter
Devon
EX4 8QE

Arch PD – Archimedes
109 Ferry Road
Hullbridge
Hockley
Essex
SS5 6EL

BBC PD – BBC
18 Carlton Close
Blackrod
Bolton
BL6 5DL

Busy Bee Computers – Archimedes
PO Box 25
Ormskirk
Lancashire
L39 3QR

RE Clark PD Library – Archimedes
Westbourne House
34 Bradley Street
Wooton–under–Edge
GL12 7AR

Cotswold PD – BBC
Maycombe
Field Road
Whiteshill, Stroud
Gloucestershire
GL6 6AG

Cream PD – Archimedes
38 Baunton
Cirencester
Gloscester
GL7 7BB

Datafile PD – Archimedes
22 Duxford Drive
Aldergrove
County Antrim
Northern Irelands
BT29 4BG

Diamond PD
86 Meadowbank
Moor Lane
Holway
Holywell
Clwyd
CH8 7EF

DataStream – Archimedes
32 Hollinwell Avenue
Wollaton
Nottingham
NG8 1JZ

Different Ideas PD – BBC
Eyton House
Eyton
Leominster
Herts
HR6 0AG

Digital Illusions – Archimedes
20 College Road
Wembley
Middlesex
HA9 8RL

Digital Phenomena – Archimedes
104 Manners Road
Southsea
Hants
PO4 0BG

DigiTech PD – Archimedes
20 Downing Crescent
Bottesfird
Scunthorpe
South Humberside
DN16 3LS

Equinox PD – Archimedes
27 Station Road
Earls Barton
Northampton
NN6 0NT

JD Public Domain – BBC
Klembergerweg 7
7214 BK Epse
Holland

Mad Rabbit PD – BBC
22 Oakwood Grove
Horbury
West Yorkshire
WF4 5JE

MHPD – Archimedes
3 Rodmell Close
Bromley
Cross
Bolton
BL7 9DT

Oxone Friendly – Archimedes
180 Cumnor Hill
Oxford
OX2 9PJ

Robert Pike
4 Mayfield Road
Girton
Cambridge
CB3 0PH

Prime PD – Archimedes
29 Tulworth Road
Poynton
Stockport
Cheshire
SK12 1BQ

Re–Run – BBC
1 Northholme Close
Grays
Essex
RM16 2NX

Skyball
PO Box 2220
Birmingham
B43 5R2

Soft Rock Software – Archimedes
124 Marissal Road
Henbury
Bristol
BS10 7NP

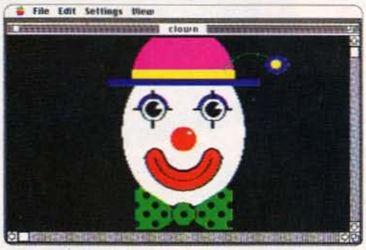
Spidersoft PD – Archimedes
218 Saville Park Road
Halifax
West Yorkshire
HX1 2XS

Telstar PD – Archimedes
The Jam Factory
40 Alderbrook Close
Rolleston, Staffs
DE13 9AH

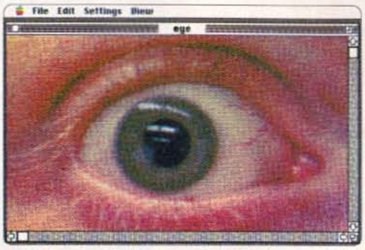
Matthew White – PD Database
The Pines
7 Peasehome
Hessle
North Humberside
HU13 0HY

The Wizard – BBC
Ryburn
Thorpe Lane
Cawood
Selby
North Yorkshire
YO8 0SQ

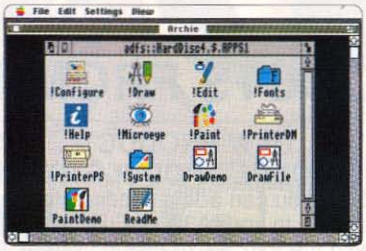
Announcing colour graphics conversion between the Acorn Archimedes and the Apple Macintosh


File Edit Settings View
clown

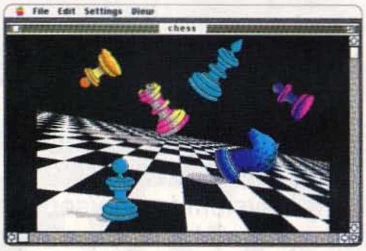
BBC Micro, Master 128, or Master Compact
Convert to or from a BBC Screen Dump in any appropriate mode, including Teletext. You can dynamically adjust the colours assigned to each logical colour in the original dump, to take account of different palette settings.


File Edit Settings View
eye

Macintosh
Convert to or from PICT, Colour PICT, or MacPaint format. Images can be manipulated in drawing and painting programs, or placed in other Macintosh applications, such as PageMaker, for subsequent colour printing.


File Edit Settings View
Archie
adfs::HardDisc4.$.APPS1
!Configure
!Draw
!Edit
!Fonts
!Help
!Microeye
!Paint
!PrinterDM
!PrinterPS
!System
DrawDemo
DrawFile
PaintDemo
ReadMe

Acorn Archimedes
Convert to or from an Archimedes Sprite in any appropriate mode. If the file contains several sprites you can select the one you want from a list of their names.


File Edit Settings View
chess

Microsoft Windows 3.0 on the IBM PC
Also … convert to or from Windows 3.0 .BMP files with up to 256 colours – the standard format for saving Windows screens, or for creating pictures in Paintbrush on the PC.

Please send me details of Colour Screen-Mac for converting graphics between Acorn Archimedes and Apple Macintosh:

Name ______________________

Position ______________________

Address ______________________

____

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Postcode ______________ Tel. ______________

Send to: Human-Computer Interface Limited, FREEPOST,
Cambridge, CB1 1BR (no stamp required if posted in UK).
Or telephone: (0223) 314934, or fax: (0223) 462562.

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Monitor Stand £24.95
Probably the best monitor stand available for the A3000 and the sturdy basis of your modular system.

System Housing £69.50
When you are ready to expand the A3000 this system housing is placed over the monitor stand, allowing two floppy drives and hard drives to be added with ease.

Expansion Card Case £14.95
If you're adding an expansion card (or podule) to your A3000 then you will need this case to connect and protect it.

Podule Expansion System £TBA
Allows two podules to be added to your A3000, and be working alongside each other simultaneously.

Disc Buffer £49.95
The definitive expansion for people that wish to add extra floppy drives. Support for 40 and 80 tracks. Will also allow you to add SCSI. We are continuously working on other options.

65Host 1770 DFS and DFS Filer £19.95
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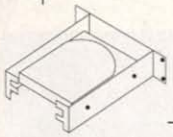


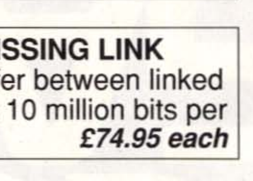
THE SPACE KIT

Allows 400 series owners to fit a second internal hard drive.

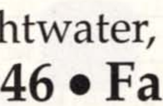
£32.95

EDUCATION ORDERS AND ENQUIRIES WELCOME.

NEW PRODUCT ..... A3K4 DOUBLE PODULE EXPANSION



Now you can add a second standard eurocard podule to your A3000. Fully integrated with the PRES expansion system - no soldering required, no timing problems, no large box bolted around your computer, simply 'plug in and expand'... (requires A3K3 expansion card case). Remember A3K6 also allows for an extra internal card; giving a total of ... 4 expansion cards in your A3000



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PRES. ADDING EXPANSION OPTIONS

PROBLEM

Your technical questions answered by MIKE COOK

Expanded A3000

I HAVE a BBC A3000 and would like to buy a second expansion card to go with the one I already have – but I can't afford a plinth and I was hoping to build one for myself.

I was wondering whether it would be possible to connect all the pin 1s together, all the pin 2s and so on. Or isn't it quite that simple?

I appreciate I'd need another power supply – what voltages are needed and what pins do they connect to? Perhaps you could do a Body Building project on it? – **Matthew Powell, Poole, Dorset.**

- *Most of the expansion card connections can be paralleled as you say. However two signals are different on each individual slot – pins 6 and 22 on row C. Pin 6 is the MEMC Podule select line (Ms) and pin 22 is the Simple Podule select line (Ps).*

On the A3000 these are wired up to make the socket Podule 0. Any extra sockets should take these signals from IC 33. Pin 5 is Ms1, pin 6 is Ms2 and pin 7 is Ms3, pin 11 is Ps1, pin 10 is Ps2 and pin 9 is Ps3.

However, things is not quite as simple as that, as many of the signals on the podule socket are high speed, therefore when extending them you have to take into consideration transmission line effects.

This is so that not only will the signals arrive where you are sending them but also to make sure that reflected signals don't crash the system.

In the A3000 backplane this is done by using a multi-layer printed circuit board to carry the signals, a technique not available to amateur constructors.

If you want to experiment you might get away with using short wires on your machine, but this is really not reliable enough for use in a Body Build article.

Multiple drives

RECENTLY I bought the Watford Electronics Archimedes External Disc Drive interface to connect a BBC Micro drive to my A3000. Fitting was quite straightforward, but when I'm using it I find that the external drive runs even when I'm accessing the internal one. There's no actual problem with reading and writing.

Is this normal, or have I missed something? If it is normal will it harm the drive or perhaps the disc that's in it? Do other disc interfaces work the same way, or is it sloppy engineering? – **Steven Sampson, Sidmouth, Devon.**

- *The "motor on" signal in multiple drive systems is common, so if one drive rotates they all do. This happens on all micros.*

You see the disc has to come up to speed before the drive is selected, so when the motor on signal is activated there is no way of knowing what drive will be accessed.

This is the way the signals come from the disc controller chip, there are simply not enough wires, on the bus or chip, to carry separate motor commands.

No harm will come to the drives or disc.

Hard disc connection

I HAVE been given a Tandon TM502 12.8Mb hard disc with its own power supply. If I upgrade my existing DNFS to ADFS can I connect it to my BBC B with 6502 second processor? If so, how? – **B. Rowe, Cheltenham, Glos.**

- *If only adding a hard disc were that easy. Just like a floppy disc, the hard variety requires a disc controller chip and supporting hardware.*

This is normally attached to the 1MHz bus and this interface is then attached to the hard disc. As far as I know nobody makes a separate hard disc interface.

Simulating traffic lights

I HAVE been trying to build a traffic lights simulator for a teacher using your Experimenters' Board so that his pupils can write special programs to control the lights' sequence.

I have written the multi-tasking front-end and the relevant bits are output to the printer port using:

```
VDU 2,1,x,3
```

The programs work well and the relays on the board switch correctly, but I can't seem to connect my LEDs correctly in order to have each one controlled by a relay.

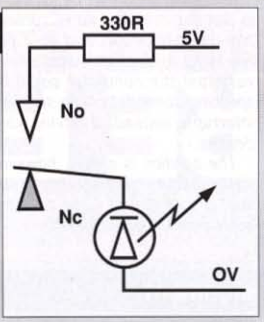
I thought I knew how to do it but my method doesn't work. Unfortunately I can't check your articles because I've lost all the magazines – actually I know exactly where they are, but a refuse tip is a write-only device.

I'd be very grateful for any help because I shall be in deep trouble if I don't get it working soon. – **Elliott Hughes, Swanwick, Derbys.**

- *I am not quite sure from your letter what, precisely, the problem is. Am I correct in thinking that the relays work and you want to turn on an LED using the relay? In which case use the circuit illustrated*

However, do you mean the LED bar display on the board? This is driven directly from the printer output and if the relays work then so should they providing link 4 has been made.

One point I have noticed is that the A3000 uses a 74LS374 octal flip-flop on its printer output, whereas the Model B employs a 74LS244 buffer chip.



The buffer chip can source more current than the flip-flop and it might just be that there is insufficient current to light the LED with the 270R series resistors. If this is the case change them to 82R.

Come to a full stop

THE full stop key on my A3000 has stopped working, is there an easy way to fix it without sending it away? Also sometimes my monitor displays white as light blue. Can you tell me what's happening?

Finally, I changed some music files on a games disc and now the game

➤

SOLVED HELP

PROBLEM SOLVED

won't run. What should I do? – **Neil White, Ryde, Isle of White.**

● *The full stop key can get quite a bit of a hammering from games, and so can be subject to wear.*

There is little a home user can do to repair a single key. If you are competent enough you could try dismantling the keyboard and cleaning under this key, but this is not an easy job.

Your monitor problem sounds as if the red video signal has an intermittent fault, this is usually due to an intermittent connection in the sockets.

Things like this are notoriously difficult to find because they never show up when you're looking for them. You'll probably have to wait until it goes permanently, then get it fixed

The moral of your final problem is never to make any modifications to an original disc, only to a backup.

The producer of the game might exchange it for a working one if you ask nicely, but since it was your fault he isn't obligated to do so.

Buffeted by buffers

I HAVE built an interface that connects to my BBC B 1MHz port consisting of three 6522 VIAs which are decoded to locations 00-0F, 10-1F and 20-2F in Page FC.

Each VIA is buffered with 74LS244 on the address lines and 74LS245 on the data lines, I've used the clean-up circuit from the Advanced User Guide to get rid of the P and Q glitches.

I'm using the VIAs to drive six D to A converters, but when driving them at speed the signals are very infrequent. The same situation occurs if the D to A converter is attached to the User Port, and taking the VIAs out of the circuit doesn't stop it happening.

I think I need an external timer to feed into a control line (CA1 or 2) and the program is to look at this input clock signal and wait until it is at the correct level before putting values to the bus. – **A. Faulkner, Bollington, Cheshire.**

● *You have gone a bit overboard with the buffering, I found no trouble in driving two VIAs direct from the bus signal and I suspect that you could drive another one. If not, then one buffer is more than enough to drive all three.*

However, you don't describe your fault terribly well. What do you mean by at speed *and* infrequent? *If your system works at a slow speed, say from Basic, it's likely that it will work at a higher speed from machine code.*

One thing you might be forgetting is that the computer works continually under interrupts and so if you are trying to drive an output device very fast the computer could be spending some of its time servicing interrupts instead of driving your devices.

The solution is simple, however. Just disable the interrupts at the start of your routine – and don't forget to enable them at the end.

Dodgy disc alignment

I SEEM to be able to read and write to discs that have been formatted by my machine and most commercial software is okay. But I have noticed that some commercial programs fail to work. What's the problem? – **T. Scott, Irvine, Ayrshire.**

● *You could have a drive or computer fault here. The first would involve head alignment, that is the positioning of the track zero detected switch. This would mean that your own formatted discs would work but other discs might be difficult to read.*

Another point might be if you had a 40 track drive. Many software houses use 40/80 switchable drives. When you write or format a 40 track disc with an 80 track drive you are only using the narrower 80 track width.

When this disc is read by a 40 track drive the head reads the track it should plus half a track of rubbish. This is sometimes enough to stop it working.

Finally it could be a computer fault, in that the software is using a portion of the computer not normally used. What you need to do is to listen to the disc drive as it loads in the software.

If it thrashes about making several attempts to read a sector before it hangs then you have a disc fault, otherwise the computer is guilty.

Did anyone spot the mistake in the September issue of Problem Solved? It was from a chap who wanted to program up a function key to substitute for his X key. Well the solution that I submitted to the editorial staff was:

```
OSCLI("KEY0"+CHR$(&58))
```

Someone on the staff, who will not own up, thought there was a simpler answer and so what was printed was:

```
OSCLI("KEY0 X")
```

Now how many of you spotted that if the X key is shot you can't type this in?

Is anybody out there?

I WAS very interested in the letter from Mr Van Reenen in your September issue about tapping the table to stop the screen flickering, as I have exactly the same problem and solution. I have had the monitor checked and the lead changed to no avail.

Recently, during a particularly bad bout of flickering, I also noticed a slight hum from the internal speakers, so I'm convinced the problem is with the A3000 itself. Of course when I took it to a dealer for checking it worked perfectly.

Do you have any further suggestions as to the likely problem and solution? – **John Vile, Kidlington, Oxon.**

● *Tapping tables is normally reserved for seances, and is not recommended for computers. What you have to do is to refine the place where you tap.*

It's like the story of the TV engineer who charged £50 for fixing a TV set by hitting it. When asked to justify his fee he said that £1.00 was for hitting it and the remaining £49.00 were for knowing where to hit it.

Isolate the monitor and computer, then tap each to see where the fault lies. If it is the computer, open it up and try tapping individual components and areas of the board, starting with the sockets. You will soon home in on the loose connection.

Not much joy

I BOUGHT a BBC A3000 and a Morley Analogue and User Port card only to discover that my old joystick wouldn't work with my new games.

Is there a program that I can use that will make the games recognise my joystick? – **Simon A. O'Neil, East Boldon, Tyne & Wear.**

● *As you have discovered, connecting a joystick to a computer is one thing, getting it accepted by the software is something else again.*

A number of Archimedes vectors can be intercepted, some concerning the mouse. Therefore it is, in theory, possible to trick some software into thinking a joystick is a mouse, providing the software reads the mouse through the correct software calls.

What you need to do is to read the Programmers Reference Manual.

However, there are two ways to use the mouse to control a game. The first is positional in the same way as the pointer is used.

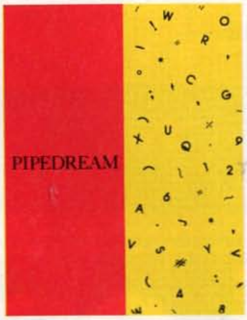
This can be derived from an analogue joystick's position, but some games use the mouse event vector so that they update the position only when it has been changed. In other words, the interrupts from the mouse demand the program look at it again.

How can this demand be generated by a joystick? In addition if the joystick auto-centres when it is released, a shift will have to be introduced by the software to auto-centre to the place the game wants as the neutral centre. Often this is not the same place as the centre of the screen.

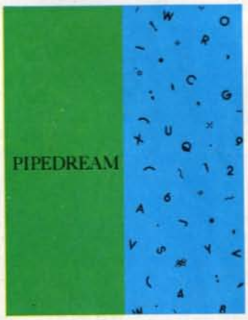
The second way a mouse can be used is directional. Your little man or whatever changes direction in response to mouse movement, the actual amount of which is irrelevant. Again, the mouse interrupts the system.

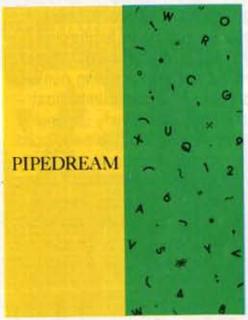
So, you see, it is not just a simple matter of writing one routine to supply a pointer position from a joystick – you will probably have to write several different routines depending upon how your game views the mouse.

Your best solution is to get the commercial joystick upgrades – from RTFM for example – which are usually supported by games writers.

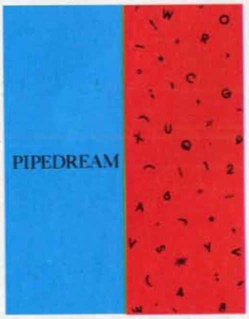


PIPEDREAM
shows
its
true
colours

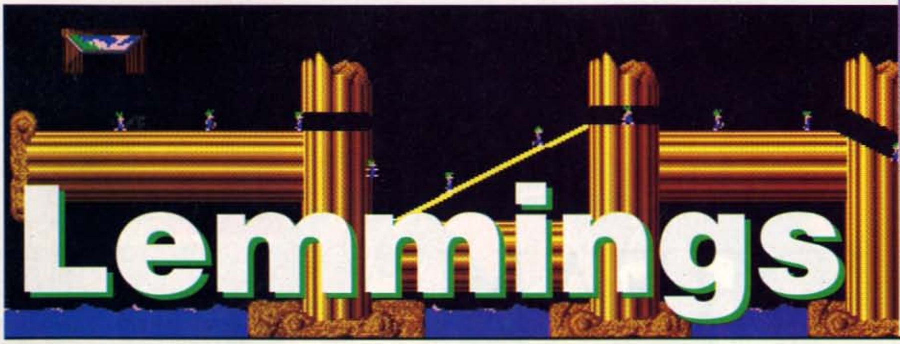




COLTON software



Software SCENE



Lemmings

99%

... all for one and one for all

WHERE do you begin to describe a game like this? Originally published by that Liverpool programming house Psygnosis, Lemmings has taken every computer by storm. Previously only available to Archimedes owners via the PC Emulator the new true and full blown version is now here.

Lemmings are cute little creatures who not only like to follow the crowd but also have a penchant for throwing themselves into life threatening situations. Our Lemming heroes are green-haired blue-suited and humanoid, but they are still cute and retain their suicidal tendencies.

Being multi-faceted types Lemmings have a surprising number of abilities. They can climb, float – with the use of a cleverly concealed umbrella – block their fellows, build bridges and dig diagonally, vertically and horizontally. They also have a built-in ability to blow up. However, not being strong on the decision-making side of things, they do need to be told what to do and when. And this is where you come in.

The menu screen is nicely animated and is mouse driven as is the whole game. You can toggle between sounds and music via the function keys as well as dispense with all sound if you want. There are at least 20 tunes and the titles for each screen are original and funny – I found Knightmare on Lem Street particularly nasty.

There are three levels of play: Fun, Tricky and Taxing. Do start with the 30 fun levels as they guide you through the different types of Lemmings teaching you skills which you will need on later screens and the more difficult levels.

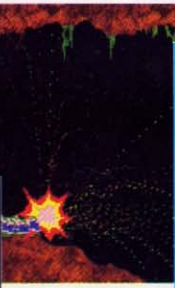
Each screen is different. Some are underground, some in hellish environments while others are free to the sky and countryside. With each screen you are required to rescue a set percentage of creatures. The Lemmings appear through a trap door at a specific rate and each screen gives you a different number and distribution of abilities available to your tribe. There is a pause option which is a good idea to use as you scroll the map to find the exit and plan your strategy. As with all games of this type it is easy once you know how.

Lemmings will travel in one direction, always starting to the right, until they can go no further. Then they turn around and go the other way – useful but deadly if you don't pop a Blocker in the way.

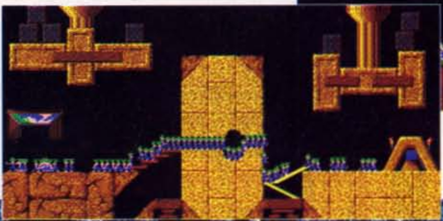
Don't use too many Blockers though as the only way to get rid of them is to blow them up – not a good idea if you have to rescue 100 per cent of the Lemmings. As each Lemming drops on to the screen he is a walker. You can then give him other abilities by choosing the one you want by clicking the icons at the bottom of the screen and then positioning your mouse on the Lemming you wish to mutate. It is a very easy and intuitive system to use.

Price: £25.99
Supplier: Krisalis Software, Teque House, Masons Yard, Downs Row, Moorgate, Rotherham S60 2HD.
Tel: 0709 372290
Requirements: BBC A3000 and Archimedes range

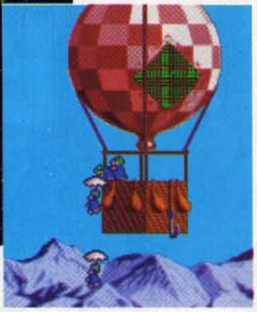
By putting your cursor over a



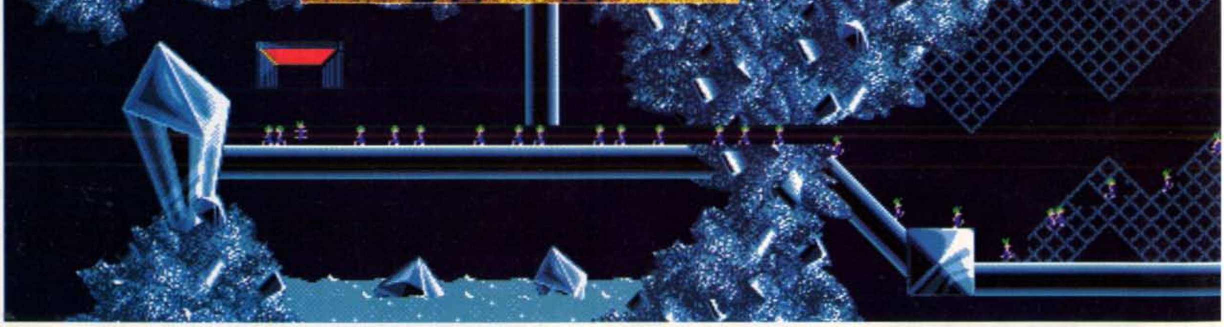
Ouch!

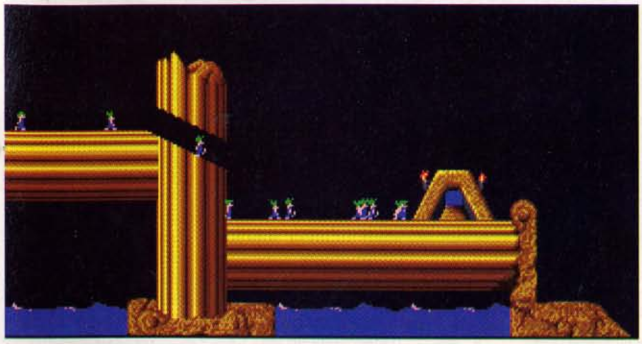


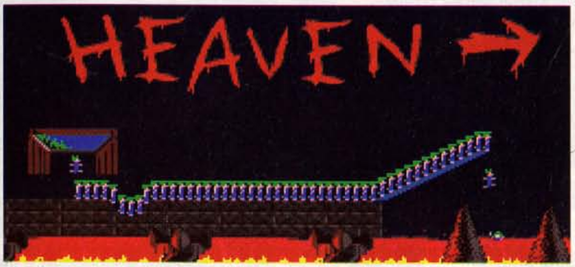
That's the way to do it



Up, up and away







Ooops!

Lemming you can tell what it is – a climber, floater or digger.

Once you change a creature into a climber or floater it stays that way, and should you change a climber into a floater he becomes an athlete and will be able to climb or drop safely till the end of the game.

However, diggers and builders only act as long as there is earth to shift or until they run out of bricks. I loved the way the builders shrug their shoulders when they can't carry on.

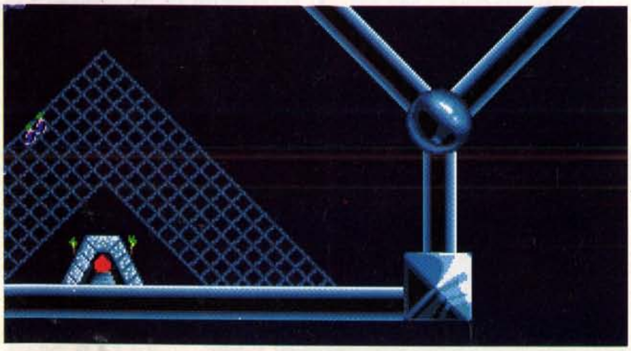
Simple you may think, but there are problems. Some surfaces can't be dug out, others can only be dug in one direction and if you get a Blocker on a bridge and have to blow him up he'll take the floor away with him.

Actually one of the funniest options is the blowing up one. You can individually blow up any Lemmings who utter an "On no" and then count down from five to one. As they take part of the landscape with them it is a useful option. Remember the good of the many ...

But should all else fail and you want to exit the level there is the nuke option. Double click on this, and all your Lemmings will cry out and wait for the inevitable. The explosion itself is very impressive.

Lemmings is probably the most addictive game I've ever played. It is funny, well programmed, has a good learning curve and the attention to detail is extraordinary – look out for the rope traps. Already voted the game of the year 1991 for the 16 bit machines it is going to be a long, long time before this game is surpassed. Thank you Krisalis.

Pam Turnbull



Software SCENE

80%

Chuck Rock

... romance à la caveman

THIS game is tailor-made for fans of ace-animator Terry Gilliam and the Flintstones, though Chuck makes Fred look like an intellectual. Basically a simple platform game it takes this genre boulders ahead of the competition.

On disc one there's a brilliantly animated introduction to the plot – but after seeing it a couple of times you can skip it.

At this point I did encounter some problems of compatibility with my IDE drive. At lot of games don't like foreign filing system but to rectify matters simply press F12 and type:

```
*DIR ADFS::0.$
```

then restart.

The game starts in earnest as you, in the role of Chuck, traverse the prehistoric landscape in search of your true love. Strange and dangerous creatures abound which can be avoided by dextrously jumping over them or hitting them with a well aimed beer belly. You can also kick with the best of them as well as carry rocks to despatch really ugly monsters or build your own stepping stones.

Dinosaurs can be killed but they are rather good at giving lifts too as long as you keep on your toes. If you prefer to swim you can do but you only have a limited amount of breath – so keep an eye on your face.

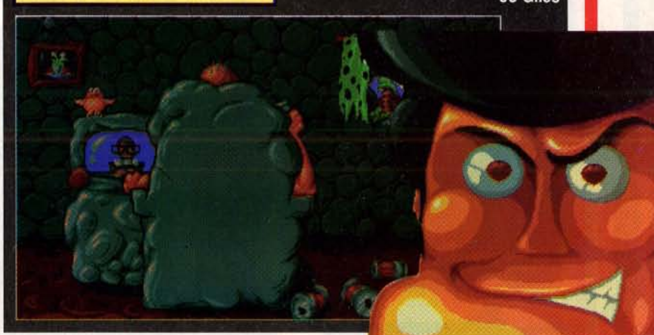
You can use keyboard or joystick but I would definitely recommend the latter as certain actions are well nigh impossible without one. Both RTFM and the Serial Port joysticks are supported.

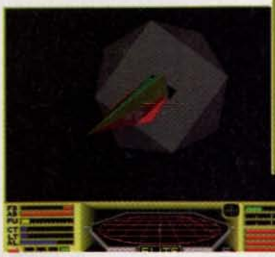
The sounds Chuck makes are digitised but the "BuggaBugga" with which he starts to the strangled screams as he is hit by hatching pterodactyls, marauding aliens – huh? – or bouncing coconuts. Before you start the game you'll also be introduced to the Chuck Rock Band. Do listen to this and watch. Not only do the musicians play in time but the correct instruments are played at the right time, even down to Ophelia's keyboard solo.

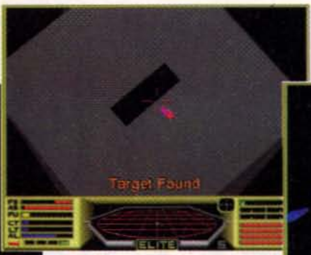
All in all Chuck Rock is a simple game which is not only well executed but has that important ingredient – humour. As with other Krisalis releases the graphics are brilliant and the attention to detail superb. Definitely one to add to any collection.

Jo Giles

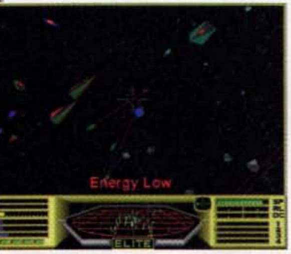
Price: £25.99
Supplier: Krisalis Software, Teque House, Masons Yard, Downs Row, Moorgate, Rotherham S60 2HD.
Tel: 0709 372290
Requirements: BBC A3000 and Archimedes range







Shooting Vipers



Space battle

Elite – the preview

... the ultimate version

FS
AS
FU
CT
LT
AL
SP
RL
DC
1
2
3
4
ELITE

WAITING for the Archimedes version of Elite to emerge in its final form has tried me sorely. For the sake of anyone who has lived on the moon for the last seven years, I ought to explain that Elite is a space-based strategy and trading game, with lots of opportunities to shoot things as well.

Appearing first on the BBC Micro, it rapidly spread to other formats and until now has been available on just about every computer except the Archimedes. In the process Elite has achieved cult status, as the correspondence in the Mad Hatter column demonstrates.

Warren Burch and Clive Gringras have produced a version of Elite that is so far superior to offerings on other machines, that it's hard to know where to begin my descriptions. It makes full use of Risc OS and is installed on your icon bar enabling you to return to the DeskTop at the click of a mouse.

Naturally you start with your trusty Cobra Mark III and a single pulse laser. But what follows – as you try to trade and battle your way up to Elite status – is so much more sophisticated, that the game rightly deserves a 'next generation' label.

The ships you encounter are now able to act – and react – intelligently. So, for instance, if your status is squeaky clean and you are under attack, a squadron of police Vipers may come to your aid, or you could stand back can watch them deal with a raid on a space station.

You can do your best to stay an upright citizen of the galaxy by trading and only using your lasers in self defence, you can pursue the profession of bounty hunter or become a pirate yourself.

Whichever course of action you follow, I can promise you that life will be exciting: It's possible to emerge from hyperspace and join in the middle of an ongoing space battle if you want – that gets the adrenalin flowing, I can tell you.

Many cargo canisters are now readily identifiable: This feature enables you to exercise some discretion as to what you scoop up. Luxuries, Radioactives and Alloys are easily recognised – and, if you inadvertently scoop up some contraband, the jettison cargo option will enable you to regain a clean record.

This facility has another use, too. Some ships – no, I won't say which, you can find out for yourselves – are simply pursuing you for the cargo in your hold. So should you find yourself under attack and the suitor in question is only after you for your money, jettisoning your cargo means you'll be left alone.

I can see this option having a use in the early stages before you can afford a Military Laser, particularly if you are the centre of attention for a crowd of totally uncouth predators. It may be cheaper to lose the profit from what you have scooped up than to bear the cost of a new escape capsule.

There are quite a number of undocumented features in this version which I may – if you twist my arm – release in grudging driblets via the Mad Hatter column. One of them concerns escape capsules.

If, like me, you equip yourself with a Mining laser you are in for some fun. You won't be the only other asteroid miner in the universe. It is possible to encounter a cluster of asteroids which are already being actively mined by other ships: You can watch them blast away and scoop up the results – then, if you want, you can enter into competition with them. Either way, it's great entertainment.

While on the matter of scooping things up, you should be aware that vessels destroyed by other spaceships will almost certainly eject cargo of various kinds. It means that a new role is possible for the Elite player – that of scavenger or jackal.

There are too many more goodies for me to list in detail, but – among other new craft – Generation Ships are now a reality. You can encounter these massive monstrosities from time to time and they are about the size of a Space Station and, lets face it, that's pretty big.

Another additional feature is the presence of Missionary Ships. These daring do-gooders go hopefully bumbling around in bunches trying to persuade naughty people in Anarchy systems to mend their sinful ways. Trouble is, not being missionaries of the muscular variety, they tend to be unarmed. I am reliably informed that somebody or other thought of me when this was programmed into the game.

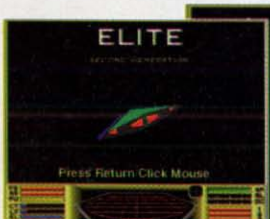
The missions are manifold – the one I tried was both daunting and entertaining. Elite alone ought to lure people into buying the Archimedes.

The documentation has been wittily written to take account of the vastly improved and extended features. This game has got to be the Christmas present of 1991. Don't forget to buy the Archimedes as well.

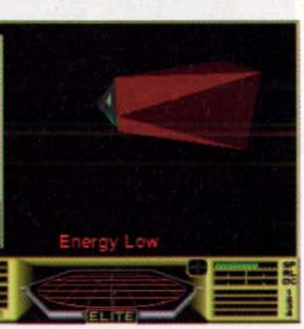
Mad Hatter

Price: £39.95
Supplier: Hybrid Technology, 88 Butt Lane, Milton, Cambridge CB4 6DG.
Tel: 0223 861522
Requirements: A3000 and Archimedes range

Software
SCENE
100%



The opening screen



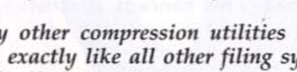
Shuttle shadowing

Double your disc capacity

for under £60

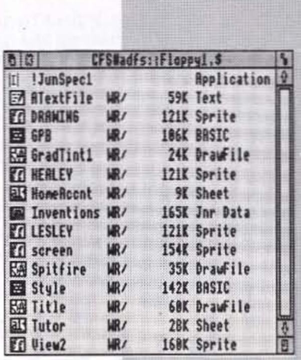
A new utility that provides completely transparent file compression and decompression. Compatible with ADFS, SCSIFS, IDEFS, and NFS allowing all file operations to occur as normal, except that it compresses the data as it is written to disc, and decompresses it again when read back. It uses LZW adaptive compression that adapts itself to the type of data so that, on average, this can achieve compression of 2 or 3 to one for most types of data - in other words, you can fit twice as much data on your disc, hard or floppy, as you would normally!

And unlike any other compression utilities it's lightning fast and works exactly like all other filing systems and is compatible with all application programs.



```
adfs::Floppy2.$
!JunSpec1                Application
ATextFile  WR/      59K  Text
```

The floppy disc on the left holds 2 files totalling 757,502 bytes. Using Compression, the floppy disc on the right holds 15 files totalling 2,032,669 bytes.

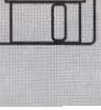


```
CFS#adfs::Floppy1.$
!JunSpec1                  Application
ATextFile    WR/     59K   Text
DRAWING6     WR/    121K   Sprite
GPB          WR/    106K   BASIC
GradTint1    WR/     24K   DrawFile
HEALEY       WR/    121K   Sprite
HomeAccnt    WR/      9K   Sheet
Inventions   WR/    165K   Jnr Data
LESLEY       WR/    121K   Sprite
screen       WR/    154K   Sprite
Spitfire     WR/     35K   DrawFile
Style        WR/    142K   BASIC
Title        WR/     60K   DrawFile
Tutor        WR/     28K   Sheet
View2        WR/    160K   Sprite
```

Compression

The file compression utility for the Archimedes

At only £49 + VAT (£57.57 inc) it's almost too good to be true!



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Gaddesden Place, Hemel Hempstead, Herts, HP2 6EX.
Tel.: 0442 63933 Fax.: 0442 231632

FIRST IRON LORD, THEN TWIN WORLD, NOW

Tower of Babel

Tower of Babel is an intricate 3D strategy game involving an interconnecting network of towers, platforms and lifts all rendered in solid 3D with innovative light and shading techniques. Take control of robot spiders and program them to solve problems and puzzles and interact with other creatures, such as Pushers, Zappers and Grabbers. Alternatively, real time control is available to you at any time for instantaneous reaction to the game 's developments.

For the more adventurous among you, there is a complete game designer, allowing the construction of your own series of towers, platforms and lifts. Attempt to fox your friends with your own fiendishly difficult creations. More than just a game, more than just a puzzle - Tower of Babel is a whole new concept in strategy gaming.

☐ Interactive strategy game featuring lifelike, solid 3D shaded graphics.
☐ Programmable and realtime control available simultaneously.
☐ Intricate, brain teasing puzzles to solve in each network.
☐ In-built game designer allowing complete control over every game parameter and network layout.

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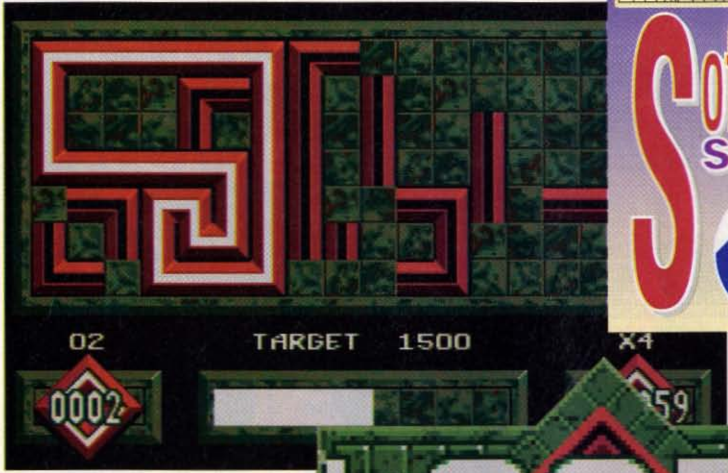
Software SCENE

90%



Larger loops gain more points

LOOPZ

... puzzle mad

IT IS so nice to see a game released on all formats that I was favourably impressed by Loopz before I even loaded it. Knowing that this game has been hanging around on the sidelines for quite a while it was interesting to see how it had actually turned out. I was not disappointed.

After playing the 8 bit version for a good few hours and being impressed by the gameplay and addictiveness, I turned to the Archimedes one and found the graphics superb and the standard of programming very high indeed.

Loopz is the latest in a long line of strategic placing games following in the footsteps of Tetris, PipeMania and their clones. But there is a lot more packed into this game than immediately meets the eye. You have the option of playing games A, B or C – though A and B are very similar. The principle behind A and B is very simple – the more loops you make, with as great a complexity as possible, the more points you'll score. There are 10 skill levels to choose from which vary the time you are given to place each puzzle piece. Completed loops vanish leaving space for more.

Each piece is a different shape and size and you can rotate the pieces to make them fit where you want them. But don't take too long to make up your mind as you have a limited time – shown by the time bar at the bottom of the screen – in which to place your piece. If you run out of time you lose a life. A score is found to the right and the number of loops you have made to date is on the left.

If you manage to clear the entire screen on Game A you'll be given a bonus score, while on Game B you'll be given a bonus screen. As before you must create loops but this time the complete loops don't disappear. There is also another way to achieve a bonus in Game B – by creating a single loop which scores more than the target score shown on the game timer. As you're looking for a loop to cover nearly all the screen, this is some challenge.

Should you succeed you'll be introduced to a random puzzle from Game C. Solve it and you'll find your time has increased when you return to the main game. It sounds complicated but it's very entertaining.

Game C is a type of pelmanism. A loop is created on screen and then it is dismantled with some of the pieces disappearing. Your task is to recreate the loop putting the pieces in the correct places as they appear. As you would expect the puzzles get harder and harder.

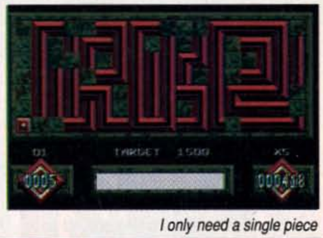
Price: £10.99 (tape) £15.99 (BBC B) £24.99 (A3000 and Archimedes)
Supplier: Audiogenic, Winchester House, Canning Road, Weeldstone, Harrow HA3 7SJ.
Tel: 081-861 1166
Requirements: Available on all formats.

This is an amazingly addictive game with your performance being measured as best score, most loopz and best loopz. The larger area you cover with your loop the higher the score. You can get to screaming pitch as you are unable to place a piece or have mistimed a drop.

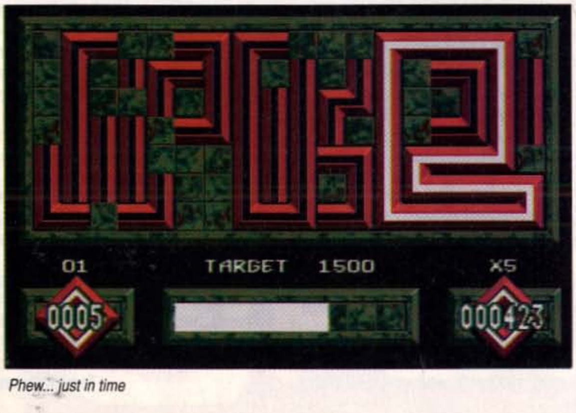
Luckily you can sometimes get a round blob rather than the usual puzzle pieces. If you place this over a puzzle piece or partly completed loop it will delete it for you, not only giving you more room to work with but a chance to create more and more loops. Don't worry if you don't want to use it as you won't lose a life.

The music and sound effects are very good and not irritating, although there is an option to do without. As you would expect sound is better on the Archimedes than on BBC and Electron. Yet the gameplay is the same on all machines, I think I'll see if I can improve my score on Game A level 6 – a bit tricky this one.

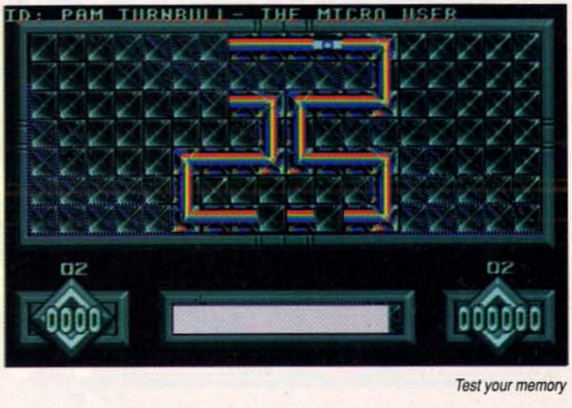
Pam Turnbull



I only need a single piece



Phew... just in time



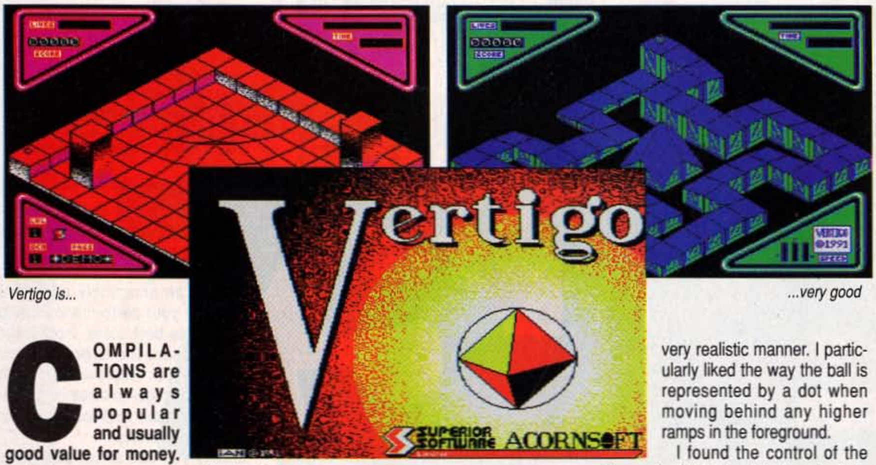
Test your memory

Software SCENE

85%

Play it Again Sam 16

... the best yet



Vertigo is... *...very good*

COMPILATIONS are always popular and usually good value for money. But when you get an excellent collection like this – Hostages, Vertigo, Perplexity and Pipemania – there is no alternative but to buy it at once.

This is a mixture of the old and new. **Hostages** was originally an Infogrammes program and is typical of their gallic flair for the unusual. You are a member of the elite – commandos in a hostage situation. Your mission is to rescue the hostages using appropriate means.

Set around a besieged embassy the game divides into three parts. Your squad must first position three snipers who run, tumble or crawl into strategic positions while being tracked by the terrorists searchlight.

You don't have to have all your men in place to start the next section, but it is advisable. Abseiling down the embassy and crashing through the window is exciting and the graphics are clear and good. It is a good idea for your snipers to shoot the windows first though as this is a very tricky procedure.

Part three consists of your men rescuing the six hostages and despatching the six terrorists. Moving around a 3D maze terrorists can appear at any time.

Terrorists are only disabled when shot but they can kill the hostages as you try to get them to a safe room on the third floor. A real challenge.

New kid on the block is **Vertigo**. It's similar to Marble Madness and manages to be very playable and it's also well presented and coded.

You control a small diamond shaped thingy which must be steered around a series of ramps and platforms – the object being to collect a gem stone. Each full level fills one screen which does not scroll.

As with most games of this type death pays frequent visits for a variety of reasons: Falling off a platform into empty space or falling too far will lose you a life. There is also a time limit which on some of the screens is extremely tight.

The gradient of the ramps and platforms that you traverse varies a lot and the diamond slides about in a very realistic manner. I particularly liked the way the ball is represented by a dot when moving behind any higher ramps in the foreground.

I found the control of the diamond a bit tricky at first particularly on the later screens where speed is of the essence. I often found that a mad dash across a particularly treacherous route was more successful than a carefully controlled approach.

There is a skip level facility and you can re-enter the game at a particular level later on by means of passwords. This does mean that once a level is completed you are unlikely to want to do it again.

There are 50 screens but some of them are very easy. I had managed to complete 20 within two hours of receiving the review copy so there might not be enough meat here to keep the avid player going for long.

I would also have liked to see more variety in the opposition and perhaps some tiles with special properties. Still it has a certain charm and the temptation to finish one more screen is very strong. Well done.

Game Over
Congratulations !
Hi-score!!!
Type In Your Name:
Shameful
Slow
Subsonic
Speedy
Supersonic
Superb
Superior
VERTIGO
©1991

Vertigo high score... upside down?

Perplexity takes the ideas of Pacman and Snapper and puts them together in 16 screens full of diamonds. Yet these gems can be elusive. Some are visible but others are only created when you push two green boulders together. Black boulders move, but they are just boulders. As you clear each screen of its precious contents you move on to the next challenge.

Of course the game is all about avoiding the problems. If you push a rock against a wall you could find yourself back at the beginning again. You can find yourself in a tight corner very easily – oh for a pull option.

Do avoid the control key swap object or you'll find yourself going back instead or forward or left instead of right. Yet the 500 point bonus object is a rather nice surprise.

As diamonds are worth a considerable amount of money, some have been put behind locked door. Luckily for you though some thoughtful programmer has left the keys around. A challenging and fun game, Perplexity is very compulsive.

Another 16-bit conversion was **Pipemania**. It has spawned at lot of replicas and can also be found in the arcades as it is very, very addictive. No violence, no puzzles and no monsters, Pipemania is a very simple game similar in concept to Tetris.

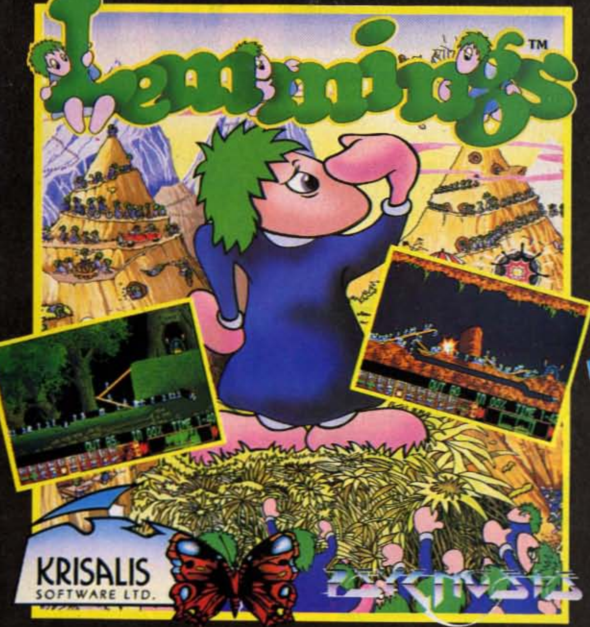
By placing bits of pipe into a grid layout you construct an intricate pattern of joined pipes. You must take the bits of pipe as they appear and place them to your best advantage. But time is against you as after a certain period flooz begins to flow along your construction. It will happily cross over itself and your task is to make the pipeline as long as possible gaining more points as you go.

Screens are in sets of four and on the lowest set you get simple pipe sections: The four quarter turns, straight horizontal and vertical and cross pieces. You can replace pieces but this takes time and nerve and the flooz gets closer.

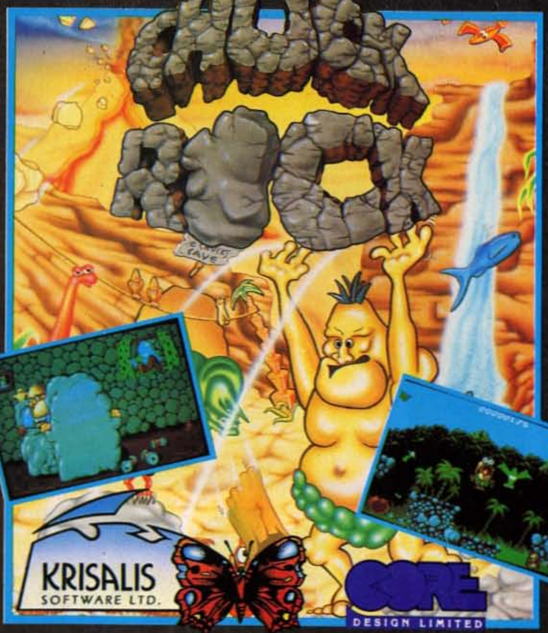
The controls are simple and add a password system, different and diverse backgrounds one, two and expert player modes and this brilliant game can soon hook you.

Tony Oakden

Price: £12.95 (tape) £14.95 (BBC B) £19.95 (Master compact)
Supplier: Superior Software, PO Box 6, Brigg, South Humberside DN20 9NH.
Tel: 0652 58585
Requirements: BBC B, Master, Master Compact and Electron



Voted the software industrie's Game of the Year. "Lemmings" by Psygnosis has to be one of the most playable games ever to be released on the unsuspecting public. "Lemmings" the hit title of 1991, now available from Krisalis for the Archimedes and BBC A3000 price £25.99.



From the moment you watch "Chuck Rock's" introduction sequence you know that this product is going to be a bit special. This is why "Chuck Rock" has been licensed by both Sega and Nintendo publishers. All of Core Design's Amiga originality has been retained including the parolex scroll, brought to you by Krisalis for the Archimedes and BBC A3000 price £25.99.

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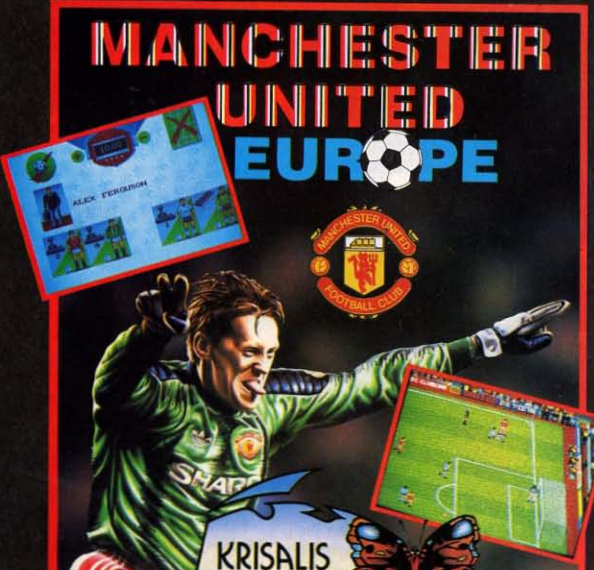

"Manchester United Europe," takes this world famous club into the European arena of club knockout competitions, which includes the European Cup, European Cup Winners Cup, UEFA Cup, European Super Cup and the World Club Championship held each year in Japan. Game features:- 2 player option (using joystick adapter) full goalkeeper control, name of player on the ball, new control method incorporating one touch football and aftertouch, animated substitutions, yellow and red cards, sending off, action replays, 170 club badges, penalty shoot outs, Arcade only option, Management only option or full simulation option. Available for the Archimedes and BBC A3000 price £25.99.

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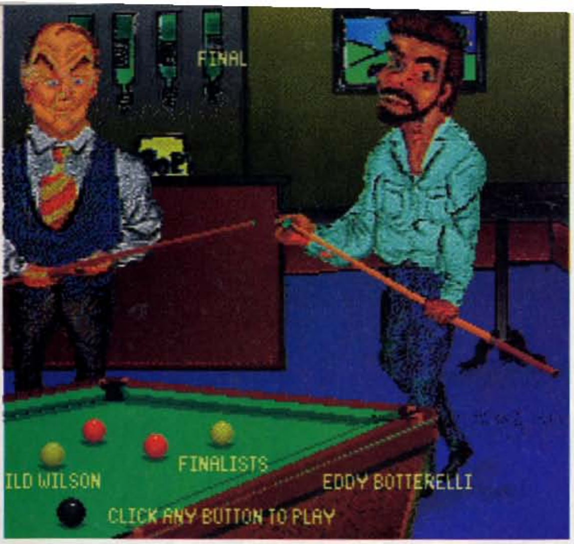


Software SCENE

65%

Break 147 and Superpool

... on the black

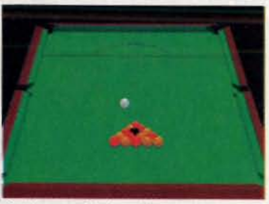
Price: £24.95
Supplier: The Fourth Dimension, 1 Percy Street, Sheffield S3 8AU
Tel: 0742 700661

FINALLY it's here, after at least one complete re-write, perhaps the ultimate simulation of both snooker and pool all in one. Once again Gordon Key has produced a game with a special feel of excellence. Out go power meters and all the palaver of any previous incarnation of Snooker and Pool, and in comes the nearest thing to real life play that you can probably get.

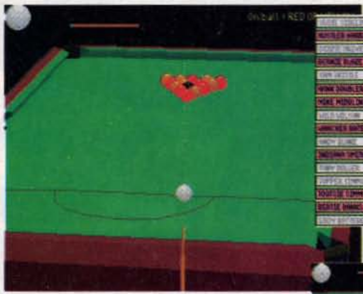
The packaging is the usual 4D video-style box containing three discs and the 16 page manual. There's a single disc one which you start with whether you're playing Break 127 or Superpool, you then double-click on the appropriate icon and are instructed to insert one of the other two discs.

For a quick start you should select the *Match* option from the list of Demo, Practice, Match and Tournament. This will set you up with a computer opponent and a best of three games. You'll lose, even if you get the worst player, but it's worth a go.

Here are the rules, briefly. In both games the idea is to hit the white ball with the point of a long stick (the cue) in such a way that it knocks certain other coloured balls around a rectangular table and into one of six pockets located at the corners and in the centre of the longer sides.



Setting up a Pool position



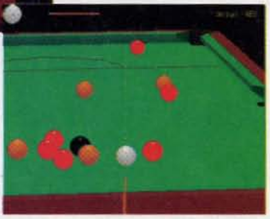
The line of movement

The white ball mustn't go into a pocket and the decision about which of the coloured balls should be hit is controlled by the rules. If you fail to pot a legal ball, play passes to the other player. The black is always the last colour to pot.

In Pool there are 15 balls, seven yellow, seven red and one black. You can hit either colour of ball into the pockets until you succeed with a particular colour. Then you must only knock that colour in – your opponent must then pot the other colour. The black ball can be pocketed when you, or your opponent, have put all of your/his colour down.

In Snooker there are 10 red balls and six others (yellow, green, brown, blue, pink and black). You must put down a red ball then you are allowed to pot another colour, then a red then a colour and so on. The colours are replaced on the table after pocketing. When all the reds are put down the colours must be potted in a specific order and are not replaced on the table.

The tournament screen



A simple cut into the corner

The screen display uses 3D vector graphics so you can view the table from any reasonable angle. In fact the angle is controlled from your position around the table, just as it would be in real life. From the middle of the table you can get a higher view than from around the ends.

You can walk round the table, with the view centred on the white ball, and choose the position you want to play from. A quick click on the mouse displays the cue on the screen with a second display above to show how far the cue is from the ball and whether you're giving the ball any top or bottom – controlled from the keyboard.

To play a ball you pull the mouse back, and the cue moves back to match, then push the mouse forwards and the cue will hit the ball and propel it according to how you played it. It is no exaggeration to say that hitting the ball is exactly like the real thing except for the feel of the cue striking the ball.

It's quite amazing. I found my learning curve in playing snooker on screen matched exactly – as far as I remember – what it was like when I first learned on a real table: Missing completely, over-cutting, hitting the cue ball too delicately and so on.

Fourth Dimension make much of the ball-hitting algorithm and they have a right to – it is tremendously accurate. In fact the real problem lies in the monitor screen because the accuracy of the ball and cue positioning can't be reflected on screen and errors occur because a shot might look right but actually may not be.

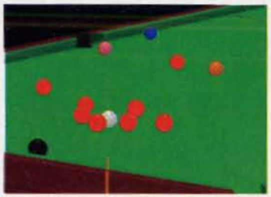
The rules of Snooker are much more complex than Pool, and one particular area is that of re-spotting coloured balls – putting them back on their spot after being potted. The rules are as follows: If the correct spot is available, the ball is put on it. If the spot is unavailable, covered by another ball, the colour is placed on the next highest value spot available.

If no other spot is free the ball is placed as close to its spot as possible. As I played through I found these rules were adhered to correctly, as well as all the other little complexities about missing balls and potting wrong colours.

I haven't tried to describe all the available options because there are so many. For example in Practice mode you can set up the table in any way you want and move balls around between shots.

If you like either game this is a must, and if you just might like them it's worth taking a chance on the most realistic snooker simulation I've ever seen – just one thing though: Give your mouse elbow room.

Steve Turnbull



An easy shot – I hope

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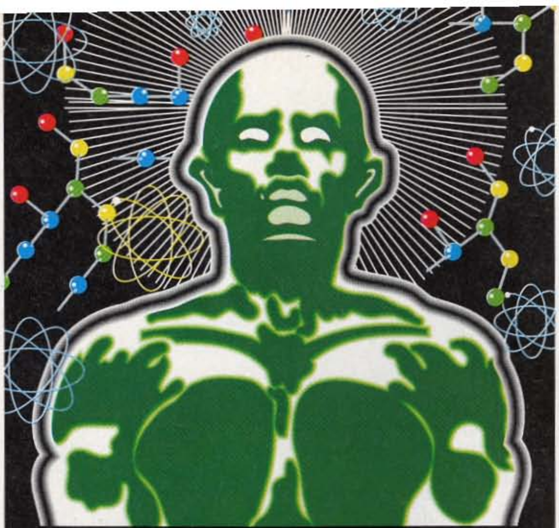


The Beeb Body Building Course

Hot on the Heels

Following through on the I²C bus

Mike Cook warms to his subject

OVER the last few months we have been looking at using the I²C interface for a number of serious and not so serious applications. Every interface has its own advantages and disadvantages – the I²C system is a simple, low-cost interface for all Acorn RISC-based machines.

It has a limitation however: It's a computer command interface. What I mean by this is that if you want to read the state of a logic input the computer has to initiate the transfer process. Most of the time this is fine but what about the situation where a signal spends most of its time quiet but occasionally bursts into frantic activity.

The only solution would seem to be to continuously monitor the line at a high speed. This is very wasteful of the computer's time as most of the time the signal will not change.

Let's look at a concrete example of this situation. There is a low cost temperature module sold by Maplin which outputs the temperature reading in a non-standard way. It has two output signals, data and clock, which allow our computer to read the temperature.

This is a serial system, so with each clock pulse a new bit of data appears and there are 13 bits in a reading. The clock pulses are about 1ms apart and there is a reading every 10 seconds. So these lines spend most of their time doing nothing.

I tackled this problem for the 8-bit machines in the September 89 issue. I used the User Port and made the clock signal generate an interrupt to read in the data when it appeared. While this technique could be used with the 32-bit machines it is a lot more complicated and due to the other requirements on the machine's interrupts it's not always possible.

However, there is a simple solution (or I wouldn't be writing this) and that is to use the serial interface. We can't connect the module directly to the serial port as the word format is totally different. In the February 91 issue I described a parallel interface that used the serial port. So what we can do is to make the module generate a small stream of serial words.

The serial port has a hardware buffer so there should always be time for the operating system to cope. Therefore every 10 seconds or so we get 13 bytes of data. Our program can pick them out at any time, which is important especially if you are working on the multitasking desktop.

Well, that's the idea so let's see how we go about doing this. The temperature module runs off a 1.5V battery so the signals are between this voltage and earth. Therefore we need two transistors to boost the signals. We can then connect this to the serial interface as shown in Figure I. You can still get the serial User Port, see the order form. After this all the rest is software.

Because of the speed the data emerges we must run the serial port at its maximum speed of 19200 baud. The format of the data is shown in Table I and the least significant bit of each piece of serial data contains the information we want.

A simple program to interpret this is shown in Listing I. Lines 10 to 100 set up the serial interface to work at the correct speed and format. Then the serial system is enabled in line 110. The main program is an infinite loop from lines 120 to 190 which simply waits for a new temperature reading and then prints it.

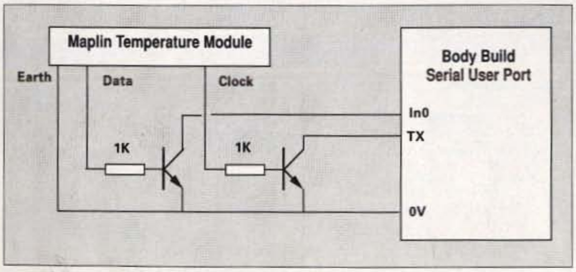
The waiting is done in a procedure which monitors how many characters are in the serial buffer, exiting when there are 13 or more. Lines 140 to 160 read these characters into an array – note that we are only interested in the least significant bit the rest of the number is removed with the AND operation.

The real work of putting these together into a reading is performed by FN_Unscram which assembles the reading into a string. If you want it in the form of a number then you can use VAL() on the result.

Line 280 determines if this is a positive or negative temperature. However the next three lines look a little complex. What we are doing here is to take each bit of each digit in turn, multiply it by the appropriate power and add it up. Then if we add the hexadecimal constant &30 the result will be an Ascii character which we can add to the previous one. Line 310 also adds a decimal point.

You can then modify this template program to suite your own needs. For example one project might be to produce a desktop thermometer. What you would do here is to use the return of a null reason code from the Wimp_Poll to test the state of the serial buffer. When this contained 13 characters you could then read them and update the temperature display window. You could have a digital display or a fancy graphical mercury thermometer.

If you wanted to have the temperature reading available to other programs on the desktop you could design a set of messages that could be used by other applications. As usual the Body Build article is just a start for your project. See you next month.



Byte	Meaning
1	Sign, 1 = -ve 0 = +ve
2	Bit 3 of Tens
3	Bit 2 of Tens
4	Bit 1 of Tens
5	Bit 0 of Tens
6	Bit 3 of Units
7	Bit 2 of Units
8	Bit 1 of Units
9	Bit 0 of Units
10	Bit 3 of Tenths
11	Bit 2 of Tenths
12	Bit 1 of Tenths
13	Bit 0 of Tenths

Table I

```
   10 REM > .IIC-Temp
   20 ON ERROR GOTO 410
   30 PRINT"Serial Port Temperature Interface Test"
   40 REM This is the initialisation
   50 *FX7,8
   60 REM 19200 BAUD RECEIVE
   70 *FX156,18
   80 REM 8 BITS NO PARITY 1 STOP
   90 REM Serial Interface now set up
  100 DIM B%(13)
  110 *FX2,2
  120 REPEAT
  130 PROC_WATE
  140 FOR N%=1 TO 13
  150 B%(N%)=FN_SP AND 1
  160 NEXT
  170 A$=FN_Unscram
  180 PRINT A$
  190 UNTIL FALSE
  200
  210 DEF PROC_WATE
  220 REPEAT
  230 UNTIL ADVAL(-2)>=13
  240 ENDPROC
  250
  260 DEF FN_Unscram
  270 LOCAL T$
  280 IF B%(1)=0 THEN T$="+" ELSE T$="-"
  290 T$=T$+CHR$((B%(2)*8+B%(3)*4+B%(4)*
2+B%(5))+&30)
  300 T$=T$+CHR$((B%(6)*8+B%(7)*4+B%(8)*
2+B%(9))+&30)
  310 T$=T$+"."+CHR$((B%(10)*8+B%(11)*4+
B%(12)*2+B%(13))+&30)
  320 =T$
  330
  340 REM Send and Read a byte
  350 DEF FN_SP
  360 LOCAL R%
  370 *FX2,1
  380 R%=GET
  390 *FX2,2
  400 =R% EOR 1
  410 REM ERROR ROUTINE
  420 ON ERROR OFF
  430 *FX2,0
  440 PRINT"ERROR ";ERR;" AT LINE ";ERL
```

```
 10 =    0 0   190 = 226C 8   320 = 2169 2
 20 = 7388 8   200 = D1AD 0   330 = D1AD 8
 30 = FB70 7   210 = B0D1 D   340 =    0 8
 40 =    0 7   220 = BFBA 4   350 = B122 4
 50 = 2BFA D   230 = 4AE8 A   360 = 769D F
 60 =    0 D   240 = ED0F 8   370 = 5123 0
 70 = 7BF8 2   250 = D1AD 8   380 = 63E3 A
 80 =    0 2   260 = 5261 8   390 = 6140 B
 90 =    0 2   270 = CC1A 0   400 = 2150 5
100 = A924 4   280 = D1CA 5   410 =    0 5
110 = 6140 8   290 = DB1D A   420 = F4C9 1
120 = BFBA 2   300 = F2C8 4   430 = 4102 7
130 = BEA6 E   310 = E3D3 9   440 = 460E E
140 = 2AD5 2
150 = 6C45 9
160 = 2C83 3
170 = D806 B
180 = 3524 0
```

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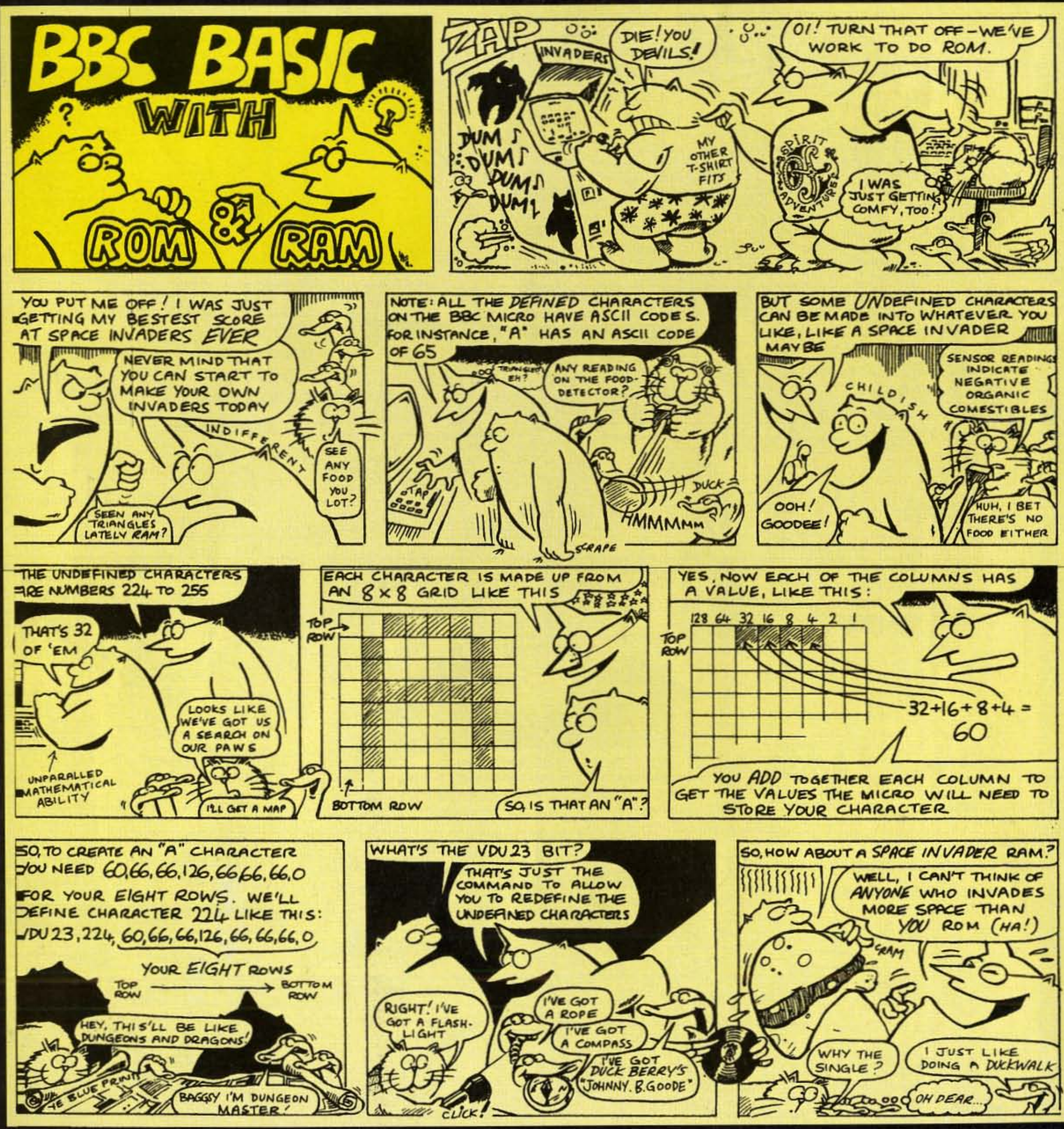
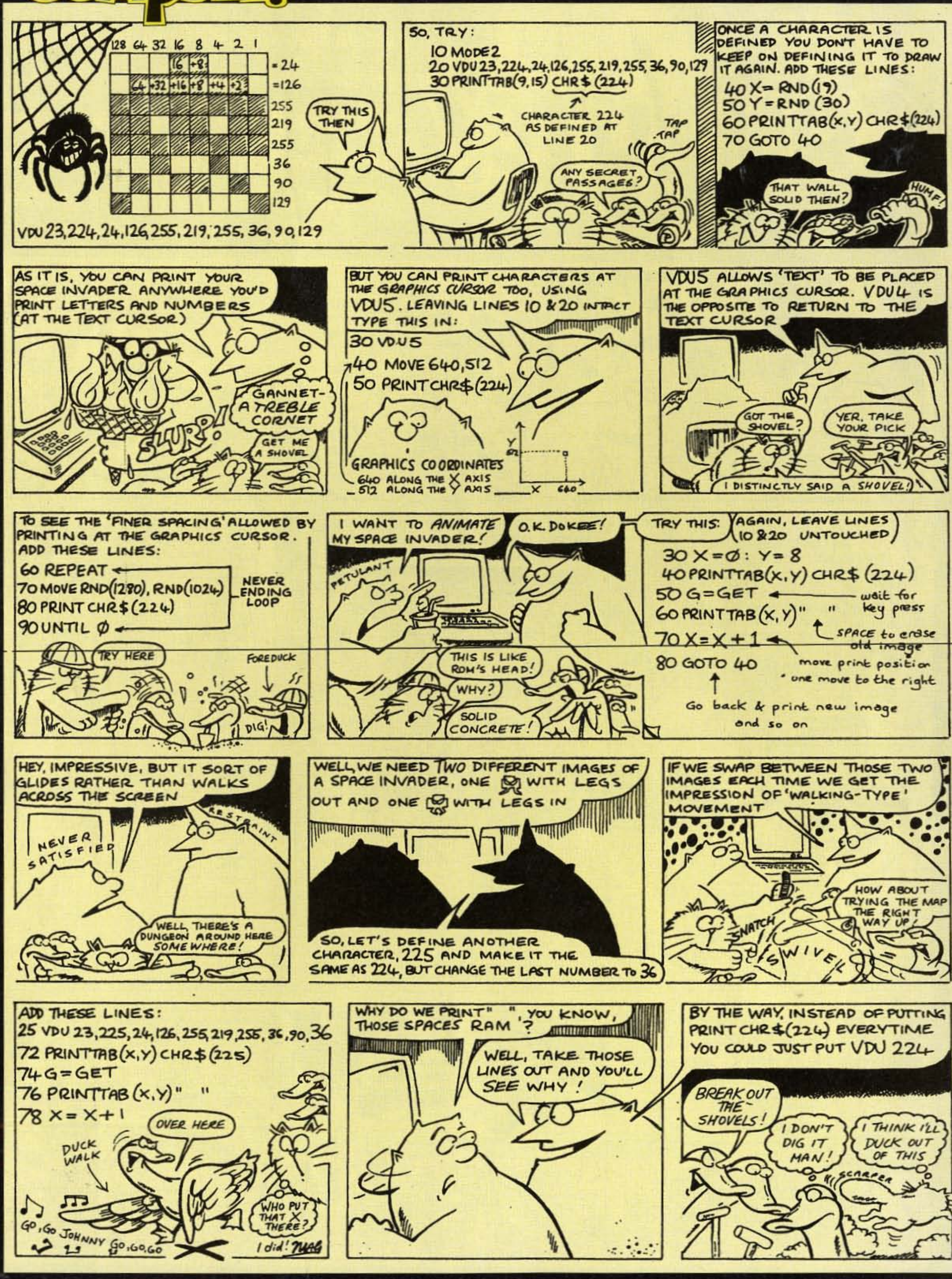

BBC BASIC WITH ROM & RAM
ZAP
INVADERS
DIE! YOU DEVILS!
DUM DUM DUM DUM
MY OTHER T-SHIRT FITS
OI! TURN THAT OFF - WE'VE WORK TO DO ROM.
SPIRIT ADVENTURE
I WAS JUST GETTING COMFY, TOO!
YOU PUT ME OFF! I WAS JUST GETTING MY BESTEST SCORE AT SPACE INVADERS EVER
NEVER MIND THAT YOU CAN START TO MAKE YOUR OWN INVADERS TODAY
INDIFFERENT
SEE ANY FOOD YOU LOT?
SEEN ANY TRIANGLES LATELY RAM?
NOTE: ALL THE DEFINED CHARACTERS ON THE BBC MICRO HAVE ASCII CODES. FOR INSTANCE, "A" HAS AN ASCII CODE OF 65
TRIANGLES EH?
ANY READING ON THE FOOD-DETECTOR?
TAP
DUCK
HMMMMM
SCRAPE
BUT SOME UNDEFINED CHARACTERS CAN BE MADE INTO WHATEVER YOU LIKE, LIKE A SPACE INVADER MAYBE
CHILDISH
SENSOR READINGS INDICATE NEGATIVE ORGANIC COMESTIBLES
OOH! GOODEE!
HUH, I BET THERE'S NO FOOD EITHER
THE UNDEFINED CHARACTERS ARE NUMBERS 224 TO 255
THAT'S 32 OF 'EM
UNPARALLED MATHEMATICAL ABILITY
LOOKS LIKE WE'VE GOT US A SEARCH ON OUR PAWS
I'LL GET A MAP
EACH CHARACTER IS MADE UP FROM AN 8 × 8 GRID LIKE THIS
TOP ROW
BOTTOM ROW
SO, IS THAT AN "A"?
YES, NOW EACH OF THE COLUMNS HAS A VALUE, LIKE THIS:
128 64 32 16 8 4 2 1
TOP ROW
32+16+8+4 = 60
YOU ADD TOGETHER EACH COLUMN TO GET THE VALUES THE MICRO WILL NEED TO STORE YOUR CHARACTER
SO, TO CREATE AN "A" CHARACTER YOU NEED 60,66,66,126,66,66,66,0 FOR YOUR EIGHT ROWS. WE'LL DEFINE CHARACTER 224 LIKE THIS:
VDU23,224,60,66,66,126,66,66,66,0
YOUR EIGHT ROWS
TOP ROW → BOTTOM ROW
HEY, THIS'LL BE LIKE DUNGEONS AND DRAGONS!
YE BLUE PRINT
BAGGSY I'M DUNGEON MASTER!
WHAT'S THE VDU23 BIT?
THAT'S JUST THE COMMAND TO ALLOW YOU TO REDEFINE THE UNDEFINED CHARACTERS
RIGHT! I'VE GOT A FLASH-LIGHT
I'VE GOT A ROPE
I'VE GOT A COMPASS
I'VE GOT DUCK BERRY'S "JOHNNY. B.GOODE"
CLICK!
SO, HOW ABOUT A SPACE INVADER RAM?
WELL, I CAN'T THINK OF ANYONE WHO INVADES MORE SPACE THAN YOU ROM (HA!)
GRAM
WHY THE SINGLE?
I JUST LIKE DOING A DUCKWALK
OH DEAR...

LET'S COMPUTE!



128 64 32 16 8 4 2 1
16 +8 = 24
64 +32 +16 +8 +4 +2 =126
255
219
255
36
90
129
TRY THIS THEN

```
VDU23,224,24,126,255,219,255,36,90,129
```

SO, TRY:

```
10 MODE2
20 VDU23,224,24,126,255,219,255,36,90,129
30 PRINTTAB(9,15) CHR$(224)
```

CHARACTER 224 AS DEFINED AT LINE 20
TAP TAP
ANY SECRET PASSAGES?
ONCE A CHARACTER IS DEFINED YOU DON'T HAVE TO KEEP ON DEFINING IT TO DRAW IT AGAIN. ADD THESE LINES:

```
40 X=RND(19)
50 Y=RND(30)
60 PRINTTAB(X,Y) CHR$(224)
70 GOTO 40
```

THAT WALL SOLID THEN?
HUMF!
AS IT IS, YOU CAN PRINT YOUR SPACE INVADER ANYWHERE YOU'D PRINT LETTERS AND NUMBERS (AT THE TEXT CURSOR)
SLURP!
GANNET-A TREBLE CORNET
GET ME A SHOVEL
BUT YOU CAN PRINT CHARACTERS AT THE GRAPHICS CURSOR TOO, USING VDU5. LEAVING LINES 10 & 20 INTACT TYPE THIS IN:

```
30 VDU5
40 MOVE 640,512
50 PRINTCHR$(224)
```

GRAPHICS COORDINATES
640 ALONG THE X AXIS
512 ALONG THE Y AXIS
Y
512
X
640
VDU5 ALLOWS 'TEXT' TO BE PLACED AT THE GRAPHICS CURSOR. VDU4 IS THE OPPOSITE TO RETURN TO THE TEXT CURSOR
GOT THE SHOVEL?
YER, TAKE YOUR PICK
I DISTINCTLY SAID A SHOVEL!
TO SEE THE 'FINER SPACING' ALLOWED BY PRINTING AT THE GRAPHICS CURSOR. ADD THESE LINES:

```
60 REPEAT
70 MOVE RND(1280), RND(1024)
80 PRINT CHR$(224)
90 UNTIL 0
```

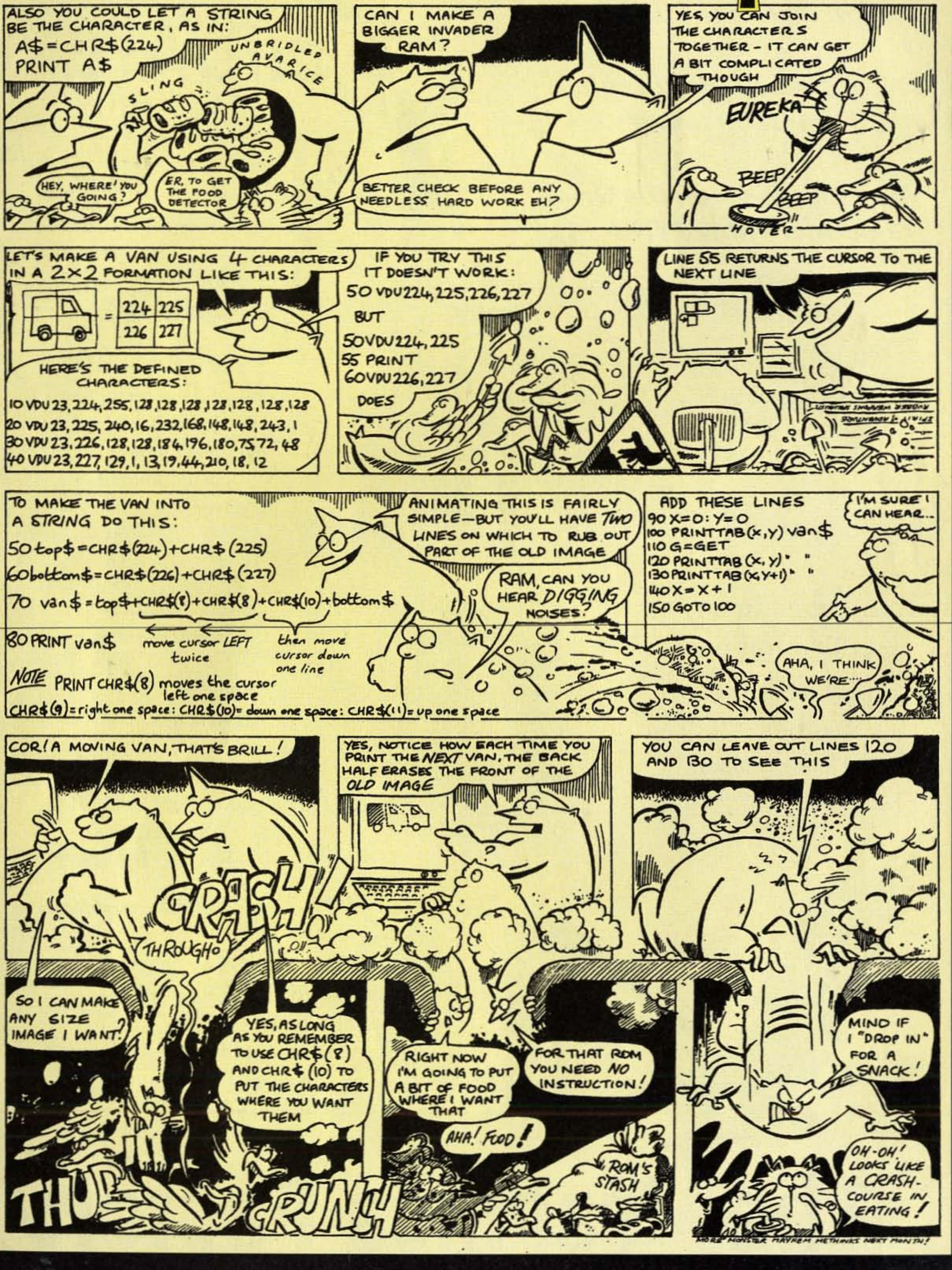
NEVER ENDING LOOP
TRY HERE
FOREDUCK
DIG!
I WANT TO ANIMATE MY SPACE INVADER!
PETULANT
O.K. DOKEE!
THIS IS LIKE RON'S HEAD!
WHY?
SOLID CONCRETE!
TRY THIS: (AGAIN, LEAVE LINES 10 & 20 UNTOUCHED)

```
30 X=0: Y=8
40 PRINTTAB(X,Y) CHR$ (224)
50 G=GET
60 PRINTTAB(X,Y)"  "
70 X=X+1
80 GOTO 40
```

wait for key press
SPACE to erase old image
move print position one move to the right
Go back & print new image and so on
HEY, IMPRESSIVE, BUT IT SORT OF GLIDES RATHER THAN WALKS ACROSS THE SCREEN
RESTRAINT
NEVER SATISFIED
WELL, THERE'S A DUNGEON AROUND HERE SOMEWHERE!
WELL, WE NEED TWO DIFFERENT IMAGES OF A SPACE INVADER, ONE WITH LEGS OUT AND ONE WITH LEGS IN
SO, LET'S DEFINE ANOTHER CHARACTER, 225 AND MAKE IT THE SAME AS 224, BUT CHANGE THE LAST NUMBER TO 36
IF WE SWAP BETWEEN THOSE TWO IMAGES EACH TIME WE GET THE IMPRESSION OF 'WALKING-TYPE' MOVEMENT
SNATCH
SWIVEL
HOW ABOUT TRYING THE MAP THE RIGHT WAY UP!
ADD THESE LINES:

```
25 VDU 23,225,24,126,255,219,255,36,90,36
72 PRINTTAB(X,Y) CHR$(225)
74 G=GET
76 PRINTTAB (X,Y)"  "
78 X=X+1
```

OVER HERE
DUCK WALK
GO, GO JOHNNY GO, GO, GO
WHO PUT THAT X THERE?
I did!
WHY DO WE PRINT" ", YOU KNOW, THOSE SPACES RAM?
WELL, TAKE THOSE LINES OUT AND YOU'LL SEE WHY!
BY THE WAY, INSTEAD OF PUTTING PRINT CHR$(224) EVERYTIME YOU COULD JUST PUT VDU 224
BREAK OUT THE SHOVELS!
I DON'T DIG IT MAN!
I THINK I'LL DUCK OUT OF THIS
SCARPER



ALSO YOU COULD LET A STRING BE THE CHARACTER, AS IN:

```
A$=CHR$(224)
PRINT A$
```

UNBRIDLED AVARICE
SLING
HEY, WHERE' YOU GOING?
ER, TO GET THE FOOD DETECTOR
CAN I MAKE A BIGGER INVADER RAM?
BETTER CHECK BEFORE ANY NEEDLESS HARD WORK EH?
YES, YOU CAN JOIN THE CHARACTERS TOGETHER - IT CAN GET A BIT COMPLICATED THOUGH
EUREKA
BEEP
BEEP
HOVER
LET'S MAKE A VAN USING 4 CHARACTERS IN A 2×2 FORMATION LIKE THIS:
224
225
226
227
HERE'S THE DEFINED CHARACTERS:

```
10 VDU 23,224,255,128,128,128,128,128,128,128
20 VDU 23,225,240,16,232,168,148,148,243,1
30 VDU 23,226,128,128,184,196,180,75,72,48
40 VDU 23,227,129,1,13,19,44,210,18,12
```

IF YOU TRY THIS IT DOESN'T WORK:

```
50 VDU224,225,226,227
```

BUT

```
50VDU224,225
55 PRINT
60VDU226,227
```

DOES
LINE 55 RETURNS THE CURSOR TO THE NEXT LINE
TO MAKE THE VAN INTO A STRING DO THIS:

```
50 top$=CHR$(224)+CHR$(225)
60bottom$=CHR$(226)+CHR$(227)
70 van$=top$+CHR$(8)+CHR$(8)+CHR$(10)+bottom$
80 PRINT van$
```

move cursor LEFT twice
then move cursor down one line

NOTE PRINT CHR$(8) moves the cursor left one space

CHR$(9)=right one space: CHR$(10)= down one space: CHR$(11)=up one space

ANIMATING THIS IS FAIRLY SIMPLE—BUT YOU'LL HAVE TWO LINES ON WHICH TO RUB OUT PART OF THE OLD IMAGE
RAM, CAN YOU HEAR DIGGING NOISES?
ADD THESE LINES

```
90 X=0:Y=0
100 PRINTTAB(x,y) van$
110 G=GET
120 PRINTTAB(x,y)"  "
130PRINTTAB(x,y+1)"  "
140X=X+1
150 GOTO100
```

I'M SURE I CAN HEAR...
AHA, I THINK WE'RE....
COR! A MOVING VAN, THAT'S BRILL!
YES, NOTICE HOW EACH TIME YOU PRINT THE NEXT VAN, THE BACK HALF ERASES THE FRONT OF THE OLD IMAGE
YOU CAN LEAVE OUT LINES 120 AND 130 TO SEE THIS
CRASH!
THROUGH
SO I CAN MAKE ANY SIZE IMAGE I WANT?
YES, AS LONG AS YOU REMEMBER TO USE CHR$(8) AND CHR$(10) TO PUT THE CHARACTERS WHERE YOU WANT THEM
RIGHT NOW I'M GOING TO PUT A BIT OF FOOD WHERE I WANT THAT
FOR THAT ROM YOU NEED NO INSTRUCTION!
AHA! FOOD!
ROM'S STASH
THUD!
CRUNCH
MIND IF I "DROP IN" FOR A SNACK!
OH-OH! LOOKS LIKE A CRASH-COURSE IN EATING!
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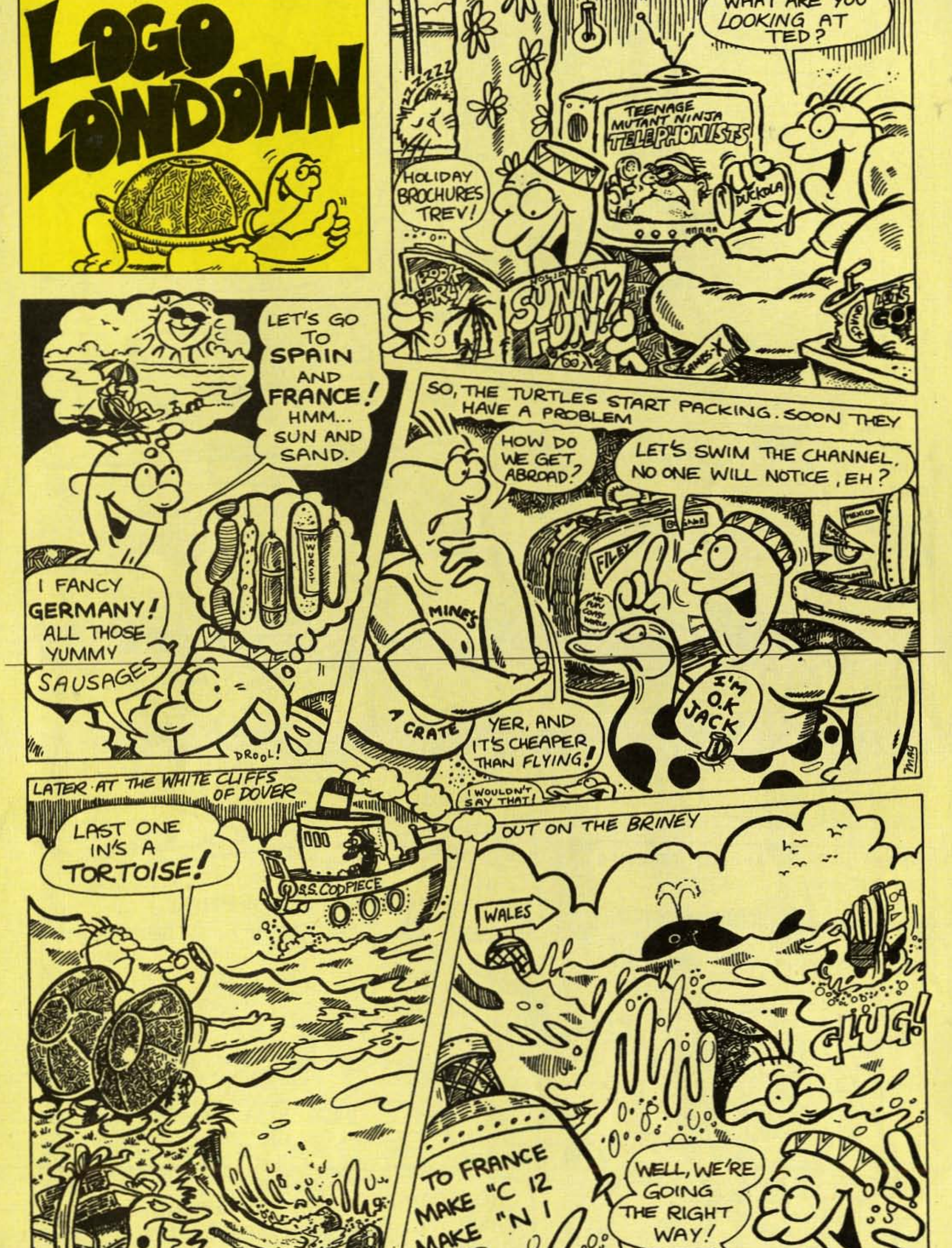
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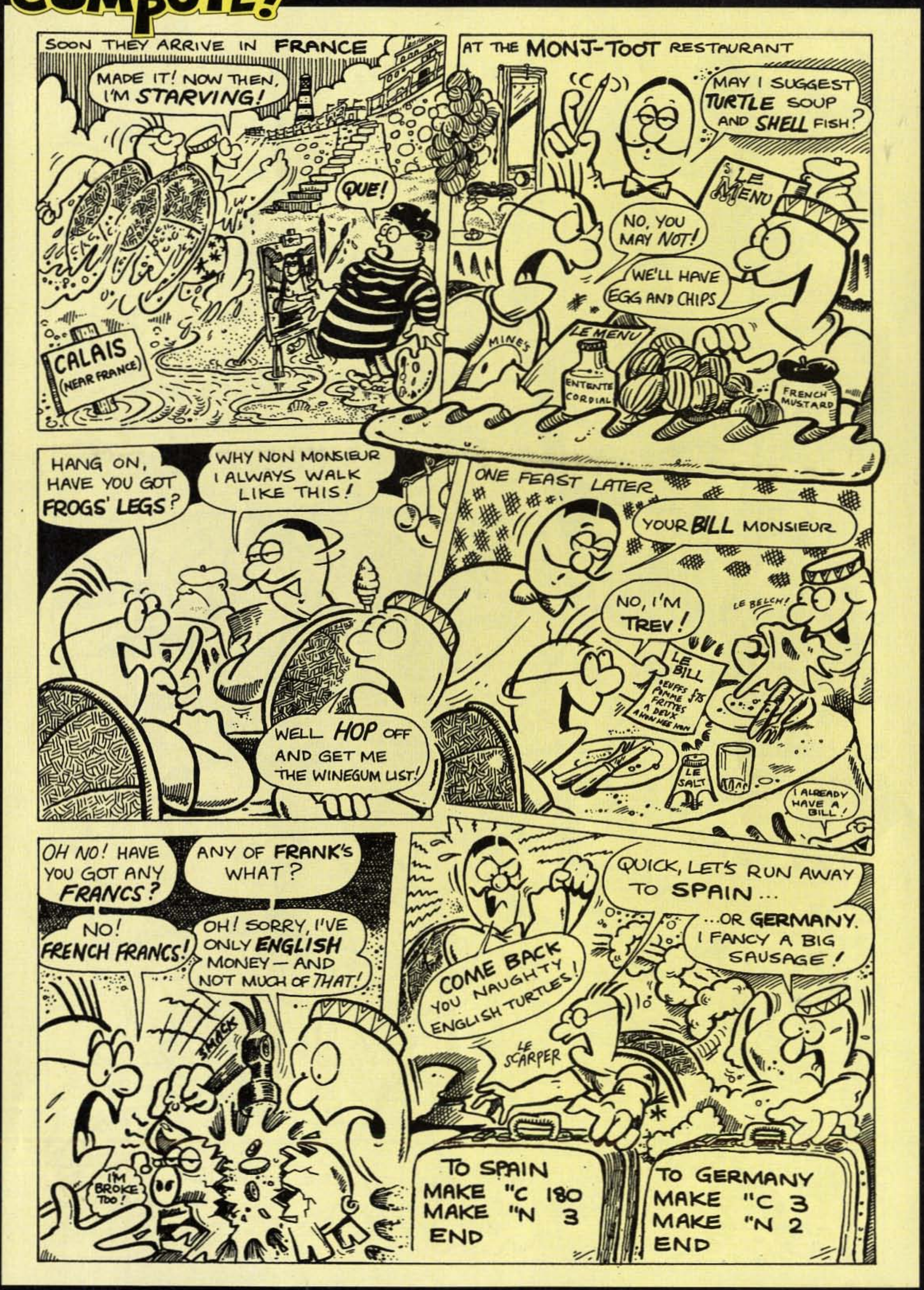
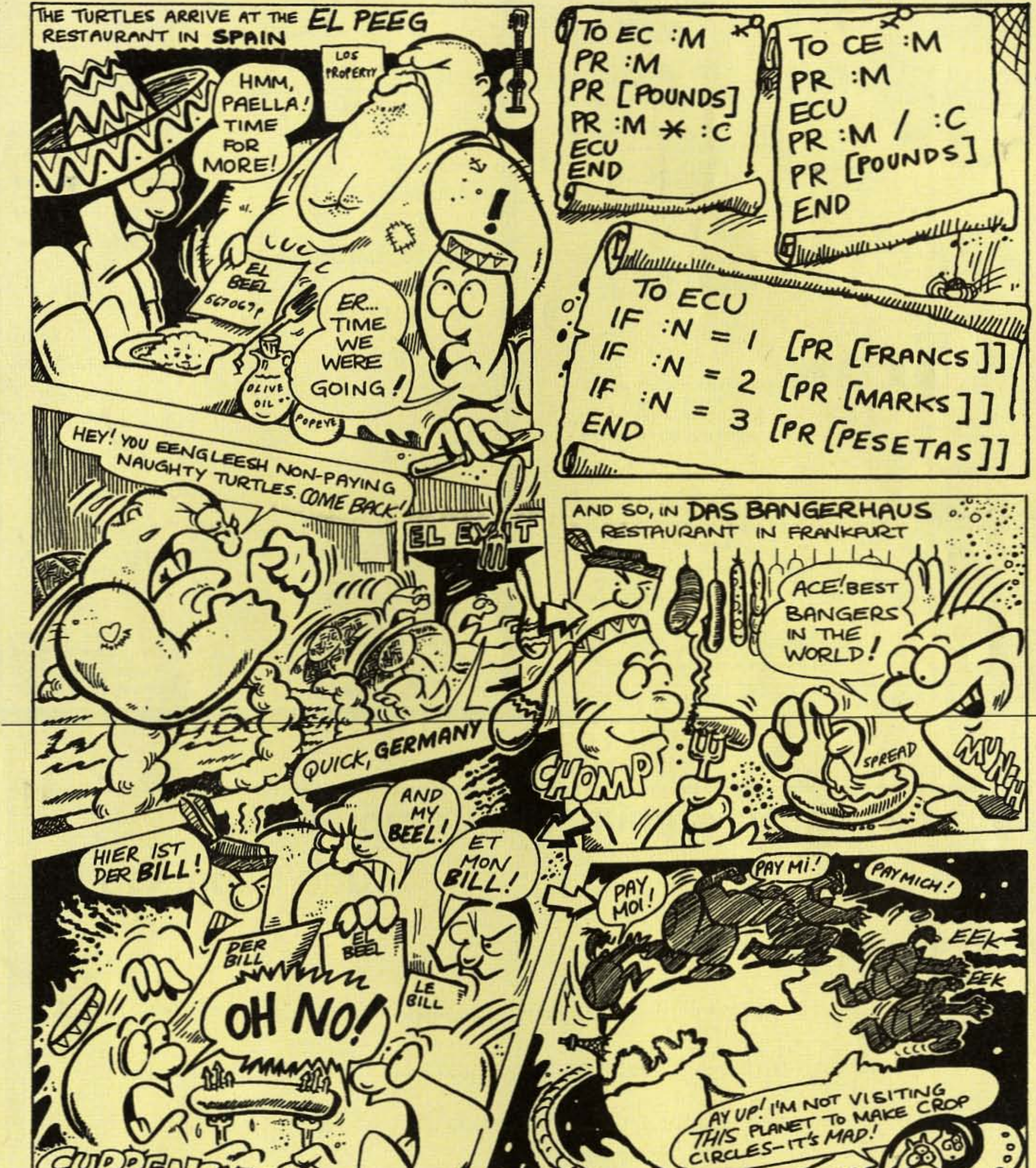
BOOK EARLY
HOLIDAYS SUNNY FUN!
LET'S GO TO SPAIN AND FRANCE! HMM... SUN AND SAND.
I FANCY GERMANY! ALL THOSE YUMMY SAUSAGES
WURST
DROOL!
SO, THE TURTLES START PACKING. SOON THEY HAVE A PROBLEM
HOW DO WE GET ABROAD?
LET'S SWIM THE CHANNEL. NO ONE WILL NOTICE, EH?
FILEY
MINE'S
CRATE
YER, AND IT'S CHEAPER THAN FLYING!
I'M O.K JACK
I WOULDN'T SAY THAT!
LATER AT THE WHITE CLIFFS OF DOVER
LAST ONE IN'S A TORTOISE!
S.S. CODPIECE
OUT ON THE BRINEY
WALES
GLUG!
TO FRANCE MAKE "C 12 MAKE "N 1 END
WELL, WE'RE GOING THE RIGHT WAY!

LET'S COMPUTE!


SOON THEY ARRIVE IN FRANCE
MADE IT! NOW THEN, I'M STARVING!
QUE!
CALAIS (NEAR FRANCE)
AT THE MONJ-TOOT RESTAURANT
MAY I SUGGEST TURTLE SOUP AND SHELL FISH?
LE MENU
NO, YOU MAY NOT!
WE'LL HAVE EGG AND CHIPS
MINE'S
LE MENU
ENTENTE CORDIAL
FRENCH MUSTARD
HANG ON, HAVE YOU GOT FROGS' LEGS?
WHY NON MONSIEUR I ALWAYS WALK LIKE THIS!
WELL HOP OFF AND GET ME THE WINEGUM LIST!
ONE FEAST LATER
YOUR BILL MONSIEUR
NO, I'M TREV!
LE BELCH!
LE BILL
OEUFS POMME FRITES A DEUX ... £75
LE SALT
I ALREADY HAVE A BILL!
OH NO! HAVE YOU GOT ANY FRANCS?
ANY OF FRANK'S WHAT?
NO! FRENCH FRANCS!
OH! SORRY, I'VE ONLY ENGLISH MONEY — AND NOT MUCH OF THAT!
SMACK
I'M BROKE TOO!
QUICK, LET'S RUN AWAY TO SPAIN...
...OR GERMANY. I FANCY A BIG SAUSAGE!
COME BACK YOU NAUGHTY ENGLISH TURTLES!
LE SCARPER

```
TO SPAIN
MAKE "C 180
MAKE "N 3
END
```

```
TO GERMANY
MAKE "C 3
MAKE "N 2
END
```


THE TURTLES ARRIVE AT THE EL PEEG RESTAURANT IN SPAIN
LOS PROPERTY
HMM, PAELLA! TIME FOR MORE!
EL BEEL 567067p
ER... TIME WE WERE GOING!
OLIVE OIL
POPEYE
HEY! YOU EENGLEESH NON-PAYING NAUGHTY TURTLES. COME BACK!
EL EXIT
QUICK, GERMANY
AND SO, IN DAS BANGERHAUS RESTAURANT IN FRANKFURT
ACE! BEST BANGERS IN THE WORLD!
SPREAD
CHOMP
MUNCH
HIER IST DER BILL!
AND MY BEEL!
ET MON BILL!
DER BILL
EL BEEL
LE BILL
OH NO!
PAY MOI!
PAY MI!
PAY MICH!
EEK
EEK
AY UP! I'M NOT VISITING THIS PLANET TO MAKE CROP CIRCLES–IT'S MAD!
U.F.O.

```
TO EC :M
PR :M
PR [POUNDS]
PR :M * :C
ECU
END
```

```
TO CE :M
PR :M
ECU
PR :M / :C
PR [POUNDS]
END
```

```
TO ECU
IF :N = 1 [PR [FRANCS]]
IF :N = 2 [PR [MARKS]]
IF :N = 3 [PR [PESETAS]]
END
```

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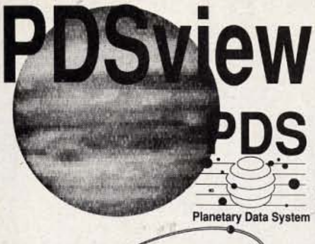
PDSview

PDS



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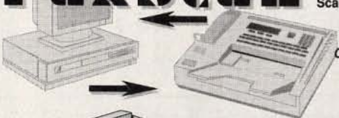

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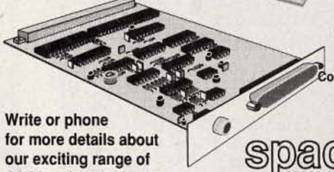

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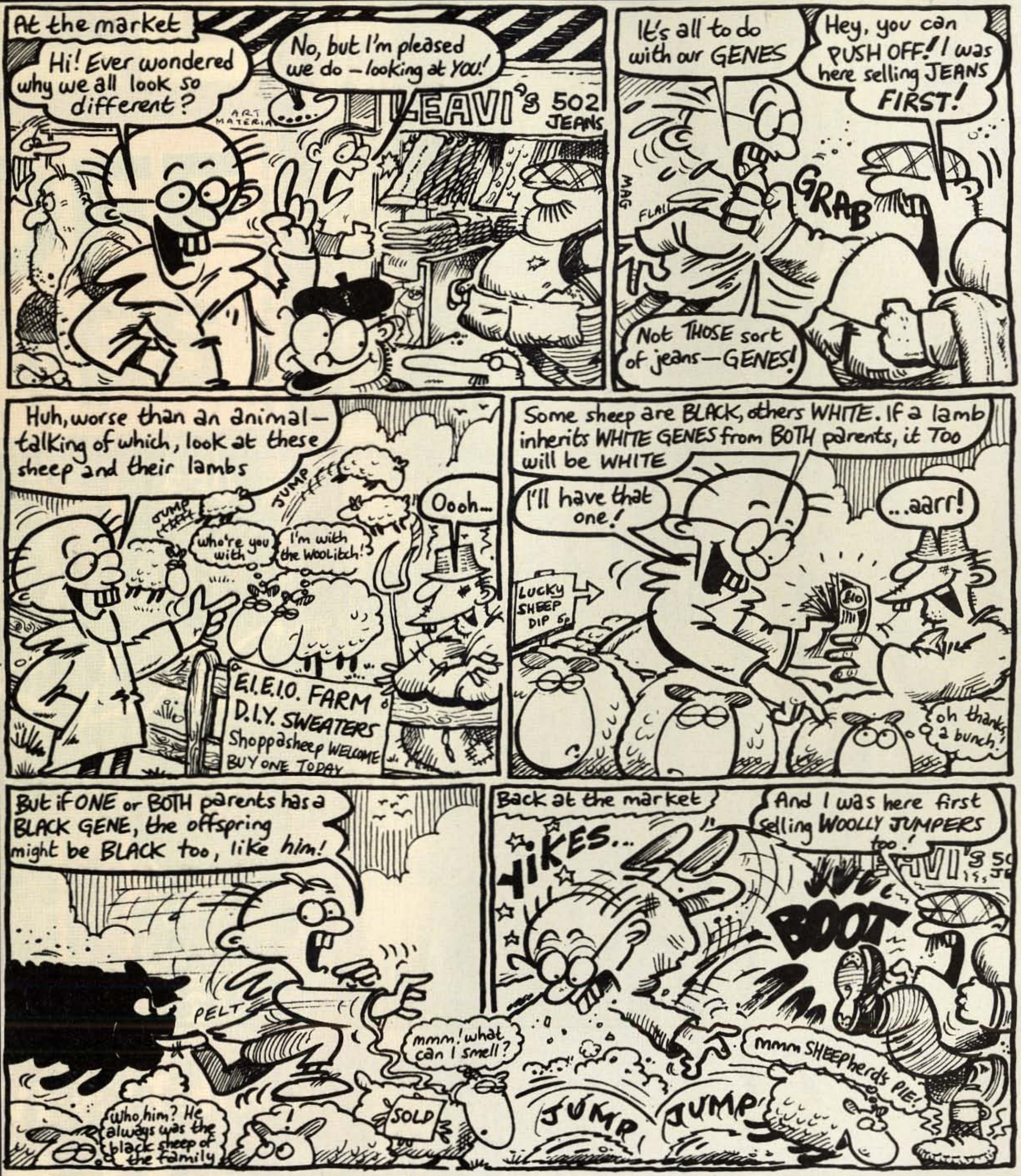
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Hi! Ever wondered why we all look so different?
No, but I'm pleased we do – looking at YOU!
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It's all to do with our GENES
Hey, you can PUSH OFF! I was here selling JEANS FIRST!
MAG
FLAIL
GRAB
Not THOSE sort of jeans – GENES!
Huh, worse than an animal – talking of which, look at these sheep and their lambs
JUMP
JUMP
JUMP
Oooh...
who're you with
I'm with the WooLitch!
E.I.E.I.O. FARM D.I.Y. SWEATERS Shoppasheep WELCOME BUY ONE TODAY
Some sheep are BLACK, others WHITE. If a lamb inherits WHITE GENES from BOTH parents, it TOO will be WHITE
I'll have that one!
...aarr!
LUCKY SHEEP DIP 5p
£10
oh thanks a bunch!
But if ONE or BOTH parents has a BLACK GENE, the offspring might be BLACK too, like him!
PELT
mmm! what can I smell?
Who him? He always was the black sheep of the family
!
SOLD
Back at the market
And I was here first selling WOOLLY JUMPERS too!
YIKES...
BOOT
JUMP
JUMP
mmm SHEEPherds PIE!

Scientist

Blue Genes

The Safe Scientist finds a simple and easy way to explore an amazing science subject

Genes are tiny parts of living cells. They transfer hereditary characteristics from one generation to the next. This might include eye colour or hair colour.

All living things inherit two genes for each of their characteristics. One comes from their mother and one from their father.

It is the huge variety of possible characteristics which makes each living individual unique.

This program concerns a variety of sheep which can have either black wool or white wool.

If a sheep has got a gene for black wool from one parent and for white wool from another, the black always wins.

Scientists say the black wool gene is *dominant* and the white wool gene is *recessive*. In the program, you pick two sheep to be the parents – the first generation. The program will then show you the colours of each of their lambs. Remember, if a lamb inherits the black wool gene – shown as *B* in the program – it will always look black.

Sheep will only look white if they get a white wool gene – shown as a W – from both parents.

What should you do with the program? Well, type it in and save it first and then you can start investigating.

Will two sheep that look black always produce black lambs? What about two white sheep?

Just as in real life, the process is random. Each pair of sheep are allowed eight lambs, which ought to be enough to see trends, but it can't be guaranteed.

Like a good scientist, you will need to repeat investigations if you wish to draw firm conclusions.

How does this tie in with the old National Curriculum? Well, the ability to organise your own investigations is very important.

One whole attainment target is also given over to genetics and evolution, so that is, too.

● That should do you for now. Listen out for some really sound advice in next month's issue.

```
   10 REM > <BasicSave$Dir>.GENETICS
   20 REM THE SAFE SCIENTIST
   30 REM (c) The Micro User
   40 DIMtype$(3),g1$(2)
   50 REPEAT:RESTORE
   60 MODE 6
   70 VDU19,0,4;0;
   80 PRINTTAB(16,1)"GENETICS"TAB(16,2)"
---------"
   90 gv=0
  100 VDU28,0,23,39,3
  110 PRINT''"Here are three possible pa
rents."''
  120 FORN=1TO3
  130 READ type$(N)
  140 PRINT;"     ";N;")     ";type$(N)
  150 NEXT
  160 PRINT''"Pick first parent (1, 2 or
 3)"
  170 INPUT;P
  180 g1$(1)=type$(P)
  190 gv=gv+P
  200 PRINT''"Pick second parent (1, 2 o
r 3)"
  210 INPUT;P
  220 g1$(2)=type$(P)
  230 gv=gv+P
  240 gv=gv-1
  250 IF g1$(1)="BB" AND g1$(2)="ww" THE
N gv=6
  260 CLS
  270 VDU26
  280 PRINTTAB(1,3)"FIRST GENERATION ...
.......";g1$(1);" and ";g1$(2)
  290 PRINTTAB(1,5)"SECOND GENERATION"
  300 FORg=0TO7
  310 ON gv GOSUB 410,440,470,500,530,560
  320 NEXT
  330 PRINTTAB(2,16)"THAT'S ALL FOLKS!"
  340 VDU28,0,23,39,20
  350 CLS
  360 VDU26
  370 PRINTTAB(2,20)"PRESS SPACE TO PICK
NEW PARENTS"
  380 REPEATUNTILGET=32
  390 UNTIL0
  400 END
  410 X=1
  420 GOSUB 590
  430 RETURN
  440 X=RND(2)
  450 GOSUB 590
  460 RETURN
  470 X=RND(4):IF X=4 X=2
  480 GOSUB 600
  490 RETURN
  500 X=RND(2)+1
  510 GOSUB590
  520 RETURN
  530 X=3
  540 GOSUB590
  550 RETURN
  560 X=2
  570 GOSUB590
  580 RETURN
  590 REM NEXT GENERATION
  600 ng$=type$(X)
  610 PRINTTAB(g*5,8);ng$
  620 PRINTTAB(0,20)"PRESS SPACE"
  630 REPEATUNTILGET=32
  640 RETURN
  650 DATA BB,Bw,ww
```

Get it right ✓

```
 10 =    0 0        340 = 82DA A
 20 =    0 0        350 = 7A16 8
 30 =    0 0        360 = B962 3
 40 = 52CB B        370 = 5BA8 B
 50 = 7D04 4        380 = 5B81 2
 60 =   B3 D        390 = 53CE 1
 70 = 3809 1        400 = FD2E 1
 80 = 7CC2 C        410 = A2D4 6
 90 = 27CD 6        420 = E6BB A
100 = B310 2        430 = 6E17 6
110 = 6E3C A        440 = C394 D
120 = ED76 D        450 = E6BB 8
130 =  B0D 8        460 = 6E17 4
140 =  40F 6        470 = D096 2
150 = 2C83 0        480 = 4F6E 6
160 = 3E2A 5        490 = 6E17 C
170 = 8A0A E        500 = 7C54 1
180 = 25D5 E        510 = D19C 4
190 = AD09 6        520 = 6E17 5
200 = 4C79 7        530 = 8296 A
210 = 8A0A 0        540 = D19C 2
220 = 5D2F 1        550 = 6E17 C
230 = AD09 3        560 = 92B7 C
240 = 7B28 F        570 = D19C C
250 = 8379 0        580 = 6E17 1
260 = 7A16 C        590 =    0 1
270 = B962 A        600 = D533 A
280 = E0F3 1        610 = 4D44 9
290 =   CB 6        620 = F42F 9
300 = 3A0A 3        630 = 5B81 9
310 = FD7C 4        640 = 6E17 4
320 = 2C83 B        650 = 9202 6
330 = B5A0 5
```

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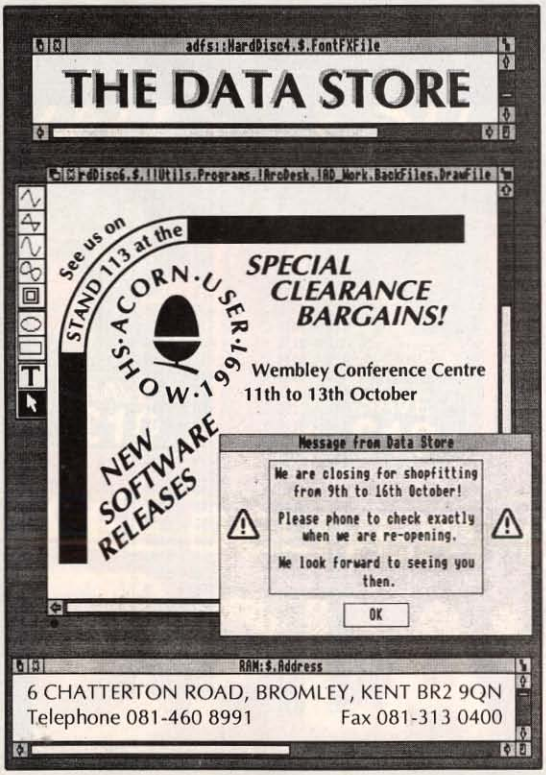
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rdDisc6.$.!!Utils.Programs.!ArcDesk.!AD_Work.BackFiles.DrawFile
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More in store

Richard Hindle reveals a method of overcoming DFS storage limitations

ONE often griped about problem with Acorn's Disc Filing System is the 31 file limit it imposes on discs. This limit, while being ample for large files, is frustrating if only small ones are to be stored.

For example, if an 80 track disc is filled with 31 files of half a kilobyte each, less than 8 per cent of the available space is actually used. There are some DFSs which allow double-size catalogues, but at the cost of full compatibility with standard Acorn DFS.

ADFS also solves the problem, but again is incompatible with DFS.

So let's look at a way of using all the available space on a disc, even with very small files. It allows a maximum of more than 700 files per disc while remaining fully compatible with standard DFSs.

The Acorn DFS and its compatibles store a catalogue – directory – of the files on the first two sectors of the disc. The first sector is for the filenames and the second for file information, roughly speaking. Other information, such as the disc's title and size, is squeezed in too.

The 31 file limit stems from the fact that the size of the catalogue is fixed at two sectors – just 31 files' worth. My system stores a user-defined number of catalogues on the disc and allows you to select which one to use.

The catalogues are stored at the bottom end of the disc. The one stored on the very lowest two sectors is the current catalogue and is used in the normal way.

Each catalogue contains at least two files, one being a machine code program called PART. When executed, with *PART, it will list the available calalogues – which I'll call *partitions* – on the disc, and when executed with:

```
*PART<name>
```

It will swap the current catalogue with the named one, making the named catalogue the current one. The other file which must be present is called !dummy!

It is, in fact, a catalogue entry rather than a file, and is there to prevent the DFS from overwriting partitions lower down the disc – all data below the current partition is masked off by the !dummy! file.

The !dummy! file enforces a lower limit on where the files in a given partition may be stored on the disc. An upper limit is also needed to protect data stored higher up the disc than the current partition.

This is achieved by fooling the DFS into thinking that the higher sectors are not formatted. Each catalogue contains a number giving the number of formatted sectors on the disc, so by changing this number we can fix an upper limit to each partition. To the DFS, the disc will look like this:

—†
2 sectors containing the current catalogue†

—†
2 sectors containing the PART file†

—†
The start of the !dummy! file†
.
(Space which must not be overwritten)†
.
.
The end of the !dummy! file†

—†
Files in the current partition†
.
.
(Spare space in the current partition)†
.

—†
Unformatted sectors†
.
.
.
.

—†

In fact, the !dummy! file's space is filled with other catalogues and partitioned files, and the so-called unformatted sectors actually contain other partitioned files.

To get going, type in the listing and ensure you've made no typing errors using the checksums and save it as MakePrt.

When RUN it asks for the number of partitions into which the disc is to be separated, along with their names and sizes, and will create the correct number of catalogues.

Each will contain locked entries for the files PART, which it assembles and saves, and !dummy!. Only one copy of PART, which is referred to by all the catalogues, is saved.

The disc can then be used as normal, using PART to move between partitions. Once the disc has been created, the sizes of partitions are fixed, but individual ones may be COMPACTed as usual to recover unused space.

TITLE may be used to change the name of a partition, but the name must be at least one character long and must not be the same as any other partition name.

BACKUP will back up the disc only as far as the current partition, as the DFS believes all higher sectors to be unformatted. So the entire disc can be backed up only by using BACKUP in the last partition to be created because all the remaining disc is contained within the !dummy! file.

COPY, and all other commands, will only work on files in the current partition.

If the PART program is to be executed on a drive surface other than that on which it was created, for example if the disc has been backed up on to its reverse side, it is necessary to reconfigure PART with the new drive number, and this is done by typing *PART Dn where *n* is 0, 1, 2 or 3.

This system would be particularly useful for anyone needing to store a large number of data files on a disc, or perhaps teletext screens, machine code utilities, small Basic programs, or wordprocessed letters – I'm sure you'll think of many more uses.

Drive check

*If you want to use a partitioned disc on a drive other than the one on which it was created, PART must be reconfigured with the new drive number by typing *PART Dn where n is the drive number.*

Using the program

Let's run through an example of creating partitions on your DFS disc. Make sure it's freshly formatted. Load up the program MakePrt and run it.

It will ask for a drive number and, assuming you're using drive zero, press 0. With the disc in the drive press a key, and you will be asked how many partitions you require. Enter a small number, say 3 or 4.

You will then be asked for names for your partitions. These should be names which you would normally use for disc titles, such as Letters, Utilities, Disc utils, Games and so on.

Next you'll be asked for their sizes in numbers of tracks and the program will tell you the range of values which are acceptable. You will be asked to verify that your partition sizes are OK, then the disc will be created with your selected partitions.

Typing *CAT or *. will show that there are the two expected files on the disc, called PART and !dummy!. Typing *PART will list the partitions you have set up, and *PART will move to a given partition.

You can save files to a partition, delete files, compact the partition, all independently of other partitions. Entering *PART SPONG or some such nonsense will result in a *No such partition* error.

```
   10 REM Disc Partitioning
   20 REM by Richard Hindle
   30 REM For B/B+/M/C with DFS
   40 REM
   50 :
   60 MODE 7
   70 DIM part_name$(66),part_size%(66)
   80 PROCget_info
   90 PROCassemble
  100 PROCcreate_disc
  110 END
  120 :
  130 DEF PROCget_info
  140 PRINT SPC9;CHR$141;CHR$134;"Disc P
artitioner"
  150 PRINT SPC9;CHR$141;CHR$134;"Disc P
artitioner"'
  160 drive%=FNget_number("Please enter
drive number",0,3)
  170 PROCoscli("DRIVE "+STR$(drive%))
  180 PRINT'"Please insert a formatted d
isc"'"and press any key...":IF GET
  190 X%=&70:Y%=0:A%=&7E:CALL &FFF1:sect
ors%=!&70/256:tracks%=sectors%/10
```

➤

➤

```
  200 IF sectors%<>400 AND sectors%<>800
 THEN PRINT '"Disc is dodgy, please re-f
ormat to"'"single-density 40- or 80-trac
k disc.":END
  210 PRINT '" Disc in drive ";drive%;"
is ";tracks%;" track."
  220 PRINT '"Enter the number of partit
ions you"'"require:"'
  230 parts%=FNget_number("Number of par
titions",2,INT(sectors%/12))
  240 cat_size%=(parts%*2+15) DIV 10
  250 PRINT'"Now enter the names of your
 partitions:"'
  260 FOR num%=0 TO parts%-1
  270 part_name$(num%)=FNget_string(STR$
(num%+1)+" of "+STR$(parts%),12)
  280 IF num%<>0 THEN FOR A%=0 TO num%-1
:IF part_name$(A%)=part_name$(num%) THEN
 PRINT"That name already exists!":A%=99:
num%=num%-1:NEXT:NEXT:ELSE NEXT
  290 NEXT
  300 REPEAT
  310 PRINT ''"Now enter the sizes, in t
racks, of"'"your partitions:"'
  320 total%=0:FOR num%=0 TO parts%-2
  330 part_size%(num%)=FNget_number(part
_name$(num%),1,tracks%-cat_size%-total%-
parts%+num%+1)
  340 total%=total%+part_size%(num%):NEX
T
  350 part_size%(num%)=tracks%-cat_size%
-total%
  360 PRINT " Leaving";CHR$131;part_size
%(num%);CHR$135;"for ";part_name$(num%)
  370 PRINT''"You have defined the follo
wing sizes:"'
  380 FOR num%=0 TO parts%-1:PRINT part_
size%(num%);:NEXT
  390 PRINT''"Are these OK (Y/N) ? ";:RE
PEAT A$=GET$:UNTIL A$="Y" OR A$="N"
  400 UNTIL A$="Y"
  410 PRINT''CHR$129;" Creating disc..."
;:ENDPROC
  420 :
  430 DEF PROCassemble
  440 cat_ptr=&80:name_ptr=&82:count=&84
:build_flag=&85:char=&86
  450 load=&53:save=&4B
  460 FOR opt%=0 TO 2 STEP 2:P%=&900
  470 [ OPT opt%
  480 JSR find_args:CMP #13:BEQ list_par
ts:JMP decode_args
  490 \
  500 .list_parts
  510 LDA #&E:STA page:LDA #10:JSR &FFEE
  520 LDA #parts%:STA count:LDA #0:STA s
ec_num
  530 .read_loop
  540 LDA #load:JSR move_bytes:JSR build
_name:JSR print_name
  550 DEC count:BEQ list_done:JSR next_p
art:JMP read_loop
  560 .list_done LDA #10:JSR &FFEE:RTS
  570 \
  580 .next_part
  590 LDA track_num:BNE ok_inc:LDA sec_n
um:BNE ok_inc:LDA #6:STA sec_num:RTS
  600 .ok_inc LDA sec_num:SEC:ADC #1:STA
 sec_num:CMP #10:BEQ inc_track:RTS
  610 .inc_track LDA #0:STA sec_num:INC
track_num:RTS
  620 \
  630 .find_args
  640 LDY #1: .args_loop
  650 LDA (&F2),Y:CMP #32:BEQ found_32:C
MP #13:BEQ end_find
  660 INY:JMP args_loop
  670 .found_32 INY:LDA (&F2),Y:CMP #32:
BEQ found_32
  680 .end_find RTS
  690 \
  700 .build_name
  710 LDA #13:STA &7C:LDA #0:STA cat_ptr
:STA name_ptr+1:STA build_flag
  720 LDA #&F:STA cat_ptr+1:LDA #&78:STA
 name_ptr:LDY #4:JSR do_build
  730 LDA #&E:STA cat_ptr+1:LDA #&70:STA
 name_ptr:LDY #8:JSR do_build:RTS
  740 \
  750 .do_build
  760 DEY:LDA (cat_ptr),Y:BEQ db_blank:C
MP #32:BEQ db_blank
  770 LDX #1:STA build_flag:JMP db_write
  780 .db_blank LDA #32:LDX build_flag:B
NE db_write:LDA #13
  790 .db_write STA (name_ptr),Y
  800 CPY #0:BNE do_build:RTS
  810 \
  820 .print_name
  830 LDA #32:JSR &FFEE:JSR &FFEE:LDY #0
: .print_loop
  840 LDA (name_ptr),Y:JSR &FFEE:CMP #13
:BEQ print_done
  850 INY:JMP print_loop
  860 .print_done LDA #10:JSR &FFEE:RTS
  870 \
  880 .move_bytes
  890 STA command:LDX #par_block MOD 256
:LDY #par_block DIV 256
  900 LDA #&7F:JSR &FFF1:LDA error:BNE d
isc_error:RTS
  910 .disc_error STA disc_error+5:BRK:B
RK:OPT FNequs("Disc Error"):BRK
  920 \
  930 .decode_args           \ (&F2),Y   po
ints to partition name
  940 TYA:CLC:ADC &F2:STA &F2:LDA &F3:AD
C #0:STA &F3:LDY #0
  950 LDA (&F2),Y:CMP #ASC"D":BNE select
_part
  960 INY:LDA (&F2),Y:CMP #48:BCC select
_part:CMP #52:BCS select_part
  970 TAX:INY:LDA (&F2),Y:CMP #13:BNE se
lect_part
  980 TXA:SEC:SBC #48:STA drive:LDA #9:S
TA page:LDA #2:STA sec_num
  990 LDA #save:JSR move_bytes:RTS
 1000 \
 1010 .select_part
 1020 LDA #0:STA sec_num:LDA #&E:STA pag
e:LDA #parts%:STA count
 1030 .select_loop
 1040 LDA #load:JSR move_bytes:JSR compa
re_names:BCS part_found
 1050 DEC count:BEQ no_such_part:JSR nex
t_part:JMP select_loop
 1060 .no_such_part BRK:OPT FNequb(50):O
PT FNequs("No such partition"):BRK
 1070 \
 1080 .part_found
 1090 LDA track_num:PHA:LDA sec_num:PHA
 1100 LDA #0:STA track_num:LDA #4:STA se
c_num:LDA #save:JSR move_bytes
 1110 LDA #0:STA sec_num:LDA #load:JSR m
ove_bytes
 1120 PLA:STA sec_num:PLA:STA track_num:
LDA #save:JSR move_bytes
 1130 LDA #0:STA track_num:LDA #4:STA se
c_num:LDA #load:JSR move_bytes
 1140 LDA #0:STA sec_num:LDA #save:JSR m
ove_bytes
 1150 RTS
 1160 \
 1170 .compare_names
 1180 JSR build_name:LDY #0
 1190 .compare_loop LDA (name_ptr),Y:ORA
 #&20:STA char
 1200 LDA (&F2),Y:ORA #&20:CMP char:BNE
no_match
 1210 LDA (&F2),Y:CMP #13:BEQ match_foun
d:INY:JMP compare_loop
 1220 .no_match    CLC:RTS
 1230 .match_found SEC:RTS
 1240 \
 1250 .par_block
 1260 .drive      OPT FNequb(drive%):BRK
 1270 .page       BRK:BRK:BRK:OPT FNequb(
3)
 1280 .command    BRK
 1290 .track_num  BRK
 1300 .sec_num    BRK:OPT FNequb(&22)
 1310 .error      BRK
 1320 ]:NEXT
 1330 ENDPROC
 1340 :
 1350 DEF PROCcreate_disc
 1360 DIM cat &200
 1370 FOR A%=cat TO cat+&1FF:?A%=0:NEXT
 1380 tracks_so_far%=cat_size%
 1390 ?&70=drive%:!&71=cat:?&75=3:?&76=&
4B:?&79=&22
 1400 FOR num%=0 TO parts%-1
 1410 $cat=LEFT$(part_name$(num%),8):$(c
at+256)=RIGHT$(part_name$(num%),4)
 1420 cat?260=8:cat?261=16
 1430 cat?262=((tracks_so_far%+part_size
%(num%))*10) DIV &100
 1440 cat?263=((tracks_so_far%+part_size
%(num%))*10) MOD &100
 1450 $(cat+8)="!dummy!":cat?15=164:$(ca
t+16)="PART    ":cat?23=164
 1460 cat!264=&80008000
 1470 cat?268=0:cat?269=(tracks_so_far%*
10-4) MOD &100
 1480 cat?270=16*((tracks_so_far%*10-4)
DIV &100):cat?271=4
 1490 cat!272=&09000900:cat?276=0:cat?27
7=2:cat?278=0:cat?279=2
 1500 IF num%=0 THEN ?&77=0:?&78=0:ELSE
?&77=(num%+2)DIV5:?&78=2*((num%+2)MOD5)
 1510 X%=&70:Y%=0:A%=&7F:CALL &FFF1
 1520 tracks_so_far%=tracks_so_far%+part
_size%(num%)
 1530 NEXT
 1540 ?&71=0:?&72=9:?&77=0:?&78=2
 1550 X%=&70:Y%=0:A%=&7F:CALL &FFF1
 1560 PRINT':ENDPROC
 1570 :
 1580 DEF FNget_number(s$,low%,high%)
 1590 REPEAT
 1600 PRINT CHR$130;s$;" (";low%;"-";hig
h%;"):";CHR$131;:INPUT""i%
 1610 UNTIL i%>=low% AND i%<=high%
 1620 =i%
 1630 :
 1640 DEF FNget_string(s$,length%)
 1650 REPEAT
 1660 PRINT CHR$130;s$;" (max length ";l
ength%;"):";CHR$131;:INPUT""i$
 1670 UNTIL LEN i$>0 AND LEN i$<=length%
 1680 =i$+LEFT$(STRING$(12," "),length%-
LEN i$)
 1690 :
 1700 DEF PROCoscli(c$)
 1710 DIM mem 40
 1720 $mem=c$:X%=mem MOD 256:Y%=mem DIV
256
 1730 CALL &FFF7:ENDPROC
 1740 :
 1750 DEF FNequs(s$)
 1760 $P%=s$:P%=P%+LENs$
 1770 =opt%
 1780 :
 1790 DEF FNequb(b)
 1800 ?P%=b:P%=P%+1
 1810 =opt%
```

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Get it right ✓

```
  10 =    0 0 | 240 = 412D 9 | 470 = E49E C | 700 = BA9E 8 |  930 = A771 B | 1160 =    0 6
  20 =    0 0 | 250 = A0D9 9 | 480 = E35B 9 | 710 = F7D9 8 |  940 = 5494 D | 1170 = B6F6 1 | 1390 = E041 A | 1610 =  E65 7
  30 =    0 0 | 260 = 4EF9 8 | 490 =    0 9 | 720 = 29BB 8 |  950 = C1A2 6 | 1180 = 3294 8 | 1400 = 4EF9 1 | 1620 = 4281 8
  40 =    0 0 | 270 = F5E0 0 | 500 = E938 4 | 730 = A911 A |  960 = BC79 8 | 1190 = DD7C 1 | 1410 = E5B1 B | 1630 = 9719 D
  50 = 9719 9 | 280 = 1B2A F | 510 = D27E 2 | 740 =    0 A |  970 = C8B8 8 | 1200 = A2D8 5 | 1420 = 785E 7 | 1640 = 3C51 D
  60 = 1092 0 | 290 = 2C83 4 | 520 = 8007 8 | 750 = 1ECA 5 |  980 = 59B6 7 | 1210 = A98C 8 | 1430 = C914 1 | 1650 = BFBA C
  70 = 48B8 1 | 300 = BFBA C | 530 = 4E73 6 | 760 = C937 2 |  990 = 8676 A | 1220 = E018 8 | 1440 = 8FB6 3 | 1660 = 4E9E 0
  80 = 77EF 2 | 310 = 1159 1 | 540 = 5024 F | 770 = C9CF 0 | 1000 =    0 A | 1230 = 6D05 4 | 1450 = F011 F | 1670 = 96A1 D
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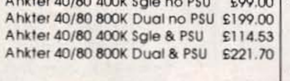

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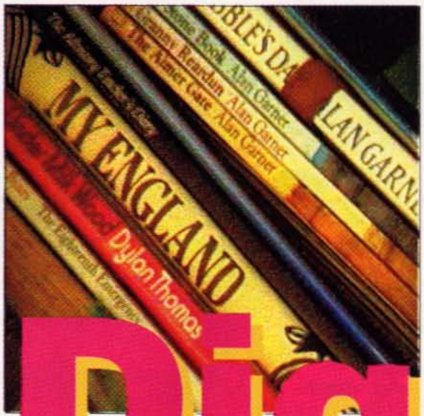
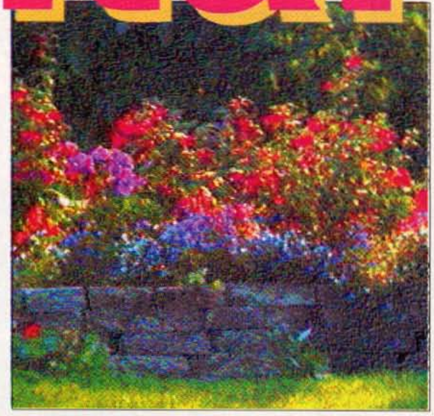
Supplier: Technomatic, Techno House, 468, Church Lane, London NW9 8UF.
Tel: 081-205 9558
Requirements: BBC A3000, A5000 and Archimedes range



Digital Art



Steve Bruntlett puts Technomatic's techno-I through its paces

ON being asked to review the techno-I Real Time Colour Digitiser my first reaction was: "Not another!". There are already a number of good quality digitisers available for the Archimedes, most of which have been tried and tested over the last couple of years, so what makes this one any different?

Well, the price for a start, techno-I is around £75 cheaper than some of its competitors. One of the other main differences is that techno-I is a 25 bit video digitiser as opposed to most of the others which are either 16 or 24 bit.

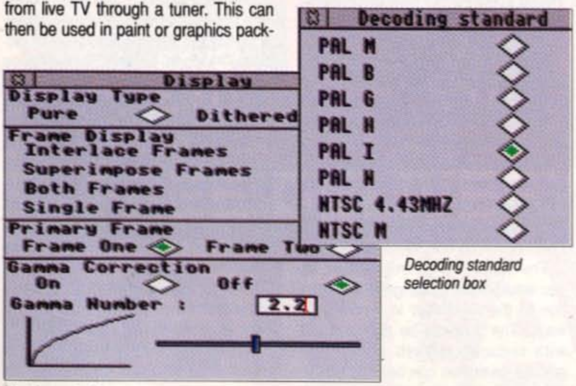
Using the YUV colour picture format techno-I handles colour with 18 bits chrominance controlling the RGB inputs, but with 7 bits instead of the usual 6, for picture format luminance (Y). So being stored separately from the colour information (UV) it can be used to control contrast, brilliance and gamma correction without affecting the original colour information.

Gamma correction is a way of overcoming the distortion that a video camera or video system introduces into a digitised image to make the image look as natural and as near the original image as possible.

In action

The techno-I colour video digitiser allows you to grab images or screens from a video camera, video tape or from live TV through a tuner. This can then be used in paint or graphics package for a wide variety of purposes from graphic design to electronic collage, from animation to games design.

The quality of such images depends on the resolution they are displayed at. Though like other digitisers, techno-I stores the digitised image with full information which can then be sent to the screen in a particular 256 colour mode. This is dependant on the decisions you make about the trade-off between screen resolution and memory constraints in the work you're doing.



Display
Display Type
Pure ◇ Dithered
Frame Display
Interlace Frames
Superimpose Frames
Both Frames
Single Frame
Primary Frame
Frame One ◆ Frame Two ◇
Gamma Correction
On ◇ Off ◆
Gamma Number : 2.2

Decoding standard
PAL M ◇
PAL B ◇
PAL G ◇
PAL H ◇
PAL I ◆
PAL N ◇
NTSC 4.43MHZ ◇
NTSC M ◇

Decoding standard selection box

Display control box

The program can capture two successive frames which can be interlaced in Mode 15 to provide a resolution of 640x512 which is equivalent to Mode 21. The digitiser also produces monochrome images which may be very useful for DTP.

One of the best features of techno-I, apart from the fact that it's fully multitasking, is that video enhancement is controlled by built-in hardware. This operates in real-time, so you don't have to save a grabbed image before you can experiment with it.

Automatic noise reduction and the cleaning of the synch part of the incoming video signal produces captured images which are much more stable than you might expect from a digitiser.

Hard news

The hardware is on a single-width card which is especially useful if you have an A400 as most other digitisers are double-width and waste one slot. It comes with a disc containing the techno-I software and a ring-bound A5 instruction booklet which gives clear instructions on installation and use.

Installation is straightforward with a long section on static electricity precautions to save zapping the podule before you start.

Software consists of !techno-I – the main techno-I application, !Telly – the secondary application, Demo – a directory which contains a really average screen shot from TV which doesn't really sell the product at all and ChangeFSI – an extremely old version of ChangeFSI despite what the adverts say. It's a shame they couldn't supply a more up-to-date

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version of this excellent utility. Although you can buy a new version from Acorn, ChangeFSI is no longer as freely available as it used to be.

Using techno-I is a doddle: Clicking on its icon brings up a viewfinder initially scaled at 1:16 which shows the current state of video signal and can be moved anywhere on screen. You can also use the !Telly application for this if you only want to see what's coming into the digitiser.

Clicking on the techno-I icon also places it on the icon bar. It then runs happily alongside any other Risc OS program such as a paint package manipulating the grabbed digitised screens.

Using a digitiser with Risc OS compatible software makes life a lot easier. But if you need extra help at any time, techno-I is fully interactive with the Help application on the Applications disc. !Telly – which puts its own viewfinder on screen – has an icon like a TV when active but looks dead when there is no incoming video signal.

The icon bar techno-eye alters according to the video input to the digitiser. It varies from an eye with a blue iris indicating a colour video signal, to a grey iris representing a monochrome signal, a closed eye when there is an invalid video signal and a crossed-out eye if you have a non-256 colour mode.

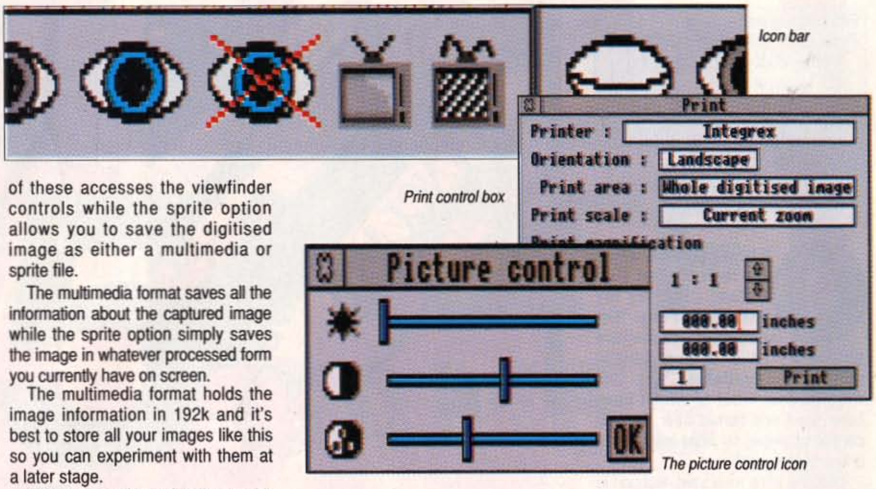
While not being able to use modes with fewer colours might seem limiting, the use of ChangeFSI allows you to change mode 15 or 21 screens to other modes with fewer colours.

Clicking on icon with Menu brings up the options for Information, Viewfinder, Sprite and Quit. The first of these accesses the viewfinder controls while the sprite option allows you to save the digitised image as either a multimedia or sprite file.

The multimedia format saves all the information about the captured image while the sprite option simply saves the image in whatever processed form you currently have on screen.

The multimedia format holds the image information in 192k and it's best to store all your images like this so you can experiment with them at a later stage.

This is done by re-loading multimedia files into techno-I and treating them as freshly digitised images. However, clicking on a multimedia file only loads techno-I and doesn't display the image which it really should do in a Risc OS program.



Icon bar

Print control box

Print

Printer : Integrex

Orientation : Landscape

Print area : Whole digitised image

Print scale : Current zoom

Print magnification

1 : 1

000.00 inches

000.00 inches

1

Print

Picture control

OK

The picture control icon

Spoilt for choice

Clicking on the icon bar icon with Select brings up a blank techno-I display window in which digitised images are displayed. This has its own much fuller menu which offers a wide range of options. Although you don't need to know what they all do in detail to start with, it's useful to know what they'll do as you experiment with different types and quality of image.

Digitise processes the incoming video signal and transfers the video picture into the techno-I display window. While the *Video* menu contains options for Controls, Input Status, Setup, Decoding and Defaults.

The Picture Control Window allows the brilliance, contrast and colour content and Input Status leads to a Video Status Control Box which is essentially used to check if the digitiser is working correctly and receiving the necessary video signal.

The Setup option with its Video Setup Control Box controls how the hardware processes video images prior to transfer to techno-I. It determines the source of video signal including Super VHS which needs an additional SVHS input upgrade. Options are also available to determine whether techno-I operates in colour or monochrome with a further option for sharper pictures in monochrome.

In particular Hue controls the degree of colour in the input video. While the Noise Filter can improve poor video signals. Leaving the Edge Enhancement aims to create distinct edges around the edges of objects – though I couldn't see any difference in edge quality while using techno-I on a Taxan 795 Multi-Synch monitor.

If you choose the Decoding option this leads to a Decoding Standard Selection Box. Here you set how techno-I decodes the input video signal in different countries.

As you would expect there is a Defaults option which allows you to set the Zoom Lock – locking the x and y zoom ratios – and is linked to the Zoom option on the Edit Menu.

The Viewfinder Control Window, as you would expect, changes the operation of the viewfinder in a variety of ways. The size can be enlarged but with reduced refresh rate, while gamma correction can be set and the viewfinder can be changed to a monochrome display if necessary. The Viewfinder Controls are the same as those on the Input Video Menu controlling brightness, contrast and colour.

You can change the position of the portion of the full digitised image through the Frame Position option. This is finally displayed in the techno-I Display Window, though why it's not all displayed I'm not sure.

Presentation and display is accessed via the Display Control Box, controlling the presentation of the picture in terms of types of display. Pure adds to this option by giving the kind of image associated with some of the older digitisers which produced a kind of posterised effect.

This is the quick option for digitising used to see if the grabbed image is what you wanted. The higher quality and excellent dither can be used when grabbing pictures but it takes longer than the Pure option. It does produce a clearer and more realistic result, but not necessarily sharper pictures.

Frame Display determines how the frames are grabbed and manipulated and displayed, with Interlace effectively doubling the vertical resolution of pictures in Mode 15 and Superimpose reducing video noise.

Both Frames permits you to see both frames in the main display area, while naturally enough Single Frame displays only one frame. On the other hand Primary Frame lets you determine which of the two frames has preference in any of the above actions. I still haven't figured out what Gamma Correction does.

Being able to control the Sprite Size Window allows the size of the displayed picture to be set independently of techno-I's frame resolution. This effectively allows you to display mode

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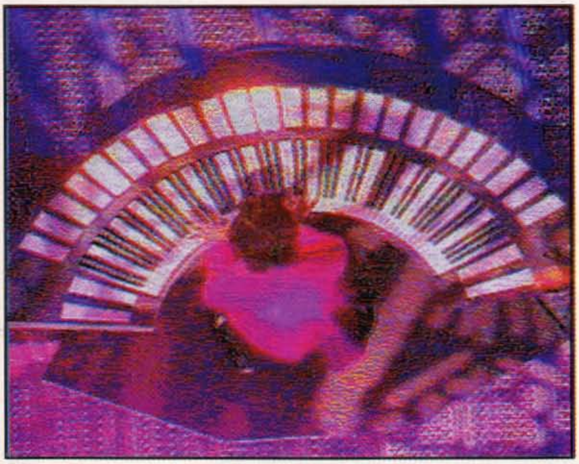

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21 quality pictures, through interlacing, in mode 15. The size of sprites is redefinable to smaller sizes and larger sizes up to 1280 by 1024. The four settings provided set the standard sizes. The 512 by 256 setting gives a square mode 15 screen and is quickest for grabbing, 512 by 512 gives square mode 21 screen while 640 by 256 and 640 by 512 equate with standard mode 15 and 21 screens.

Moving on to the Edit Menu you can flip the sprite around the X and Y axes. Cut selects part of the screen when using the Save option and Zoom Window alters the scale of the displayed image.

If you reduce an image to a quarter of its original size it looks really sharp but the only way you seem to be able to capitalise on the sharpness is by freezing the screen, using other software and then using it in a paint package.

RGB Balance has its own window to control the weighting of the red, blue and green components of the displayed picture. This is extremely easy to use and allows the RGB components to be increased or reduced, inverted – allowing psychedelic colour effects– or turned off completely. Printing is done directly from the Display Window using the currently installed driver with options for orientation, printing an area – a whole scanned image, marked area or current window – as well as setting the scale, magnification and number of copies.

You can save images in two formats: Multimedia or Sprite. Using the Sprite option displays information about the sprite and allows you to save a marked section previously defined with the Cutting Box.

When saving Multimedia images remember that you can reload them into techno-I and carry on as if they'd just been scanned. The main problem I had with the Multimedia option was in saving work.

Having saved the first image I wanted to amend the pathname but couldn't add to, or change, the pathname without completely deleting it. It's only a minor niggle but it needs looking at.

Summing up

The illustration on the left is a snapshot of my bookcase with the video camera propped up on the edge of the settee with only room lighting as I set up the digitiser to find out how it worked.

It was the first grab I did just to see if the digitiser was working and shows how easy the system is to use and what quality of image you can achieve without having to do a lot of complicated setting up.

For this review I followed fairly closely the structure of the manual to systematically look at and try to understand every option available. I'd like to say that this is an excellent and easy to use product suitable for anyone looking for a high quality digitiser at a very reasonable price.

It worked equally well with video camera and video tape. I just hope that Technomatic don't want their review digitiser back too soon. There are a few more things I'd like to try out first.

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Strictly for

SETTING up frames on a page is all very well, but it lacks a certain excitement. You're bound to want to handle text, so let's see how Impression shapes up in this area.

First, let's type in some words. Anything will do – a nursery rhyme or perhaps part of this magazine. You'll need a frame to type in, so create two overlapping frames as you did last month.

Move the cursor over the frame on top and click Select. The frame is selected and the red caret appears in the top left corner, showing that Impression is ready to receive text.

Now start typing. The first few letters may take a moment or two to appear while the letter shapes are calculated, but the screen will soon catch up with you.

Note that the typefaces supplied on the demonstration disc are deliberately incomplete for copyright reasons. In particular the number 9, the ! character and the capital letter Z are missing.

If you make any mistakes use the Delete key to remove the letter behind the caret, or the Copy key to remove the letter to the caret's right. Keep typing until you have just filled the frame, but don't overfill it.

As in any word processor, you can move the text cursor – the caret – around with the cursor keys. The Home key always takes you to the start of the piece of text and you can quickly get to any part of the text on screen by moving the mouse pointer and clicking Select.

Now let's move a few words about. Put the pointer at the start of your text, click and hold Select, and then smartly – before the pointer has time to change to a hand – move the pointer to the start of the second sentence, holding Select down all the time. Then release the button.

If you did it accurately you'll see the first sentence marked in black, rather like Figure I. This is called the selected region. If you missed, you can have as many tries as you want at getting it right, because every time you click Select in a text frame the caret moves to that point and any previously selected region is deselected.

So how can you move the marked words? Let's think of the print as though it were on paper. First you would identify the part you wanted to move, then you would cut it out and put it somewhere safe. Next you would find the place you wanted to insert it and finally you would paste it into position.

Well, we've marked the text, so we can cut it out. Go to the *Edit* submenu and click on *Cut text* – the selected region will disappear. Although you can't see it now, it's somewhere safe, in a part of memory that Impression has allocated to a clipboard.

To put the cut sentence somewhere else, say after the second sentence – which is of course now the first – move the caret after the full stop and the space at the end of the sentence, then click on *Paste text* in the *Edit* submenu.

If you didn't get the positioning quite right when marking the text or choosing the insertion point there may be odd spaces to be sorted out. With a little practice you'll soon get the hang of it.

You may have noticed that before you cut the text, the *Paste* option was grey and inoperative. Impression, like other well-behaved applications, won't let you make impossible choices.

The text on the clipboard is still there, and to prove it select the other frame and click on *Paste text* again. The first sentence will appear there too.

The contents of the clipboard can be pasted as many times as you like – until you cut something else, in fact.

There's another and often more convenient way of marking a section of text, and we'll use it on the new first sentence in the original frame.

Click and release on the start of the text, then move the pointer to the end of the sentence and click Adjust. The sequence Select, move, Adjust is worth learning and it works forwards or backwards, as does the Select and drag method.

While the sentence is marked, we can use it to show that copying text is very similar to moving it – just select *Copy text* instead of *Cut text* from the *Edit* submenu.

Try it out and see if you can copy the sentence to the other frame, ending up with the two sentences in their original order. Multiple clicks can be used to select pieces of text quickly. If you double-click with Select on a word, that word and the space after it will be marked.

Three clicks select the current line, and four clicks mark the current paragraph. The entire piece of text can be selected with Control+T. Try these out on the copied text in the overlapped frame, then delete it all.

Sizing matters

You won't always want to look at your work at the size it's at now – you'll sometimes want to see how a whole page is developing, or perhaps work at closer quarters. The *Scale view* dialogue box, shown in Figure II, let's you choose how large or how small the page looks on screen.

Some preset values are programmed into the red keys when pressed with Shift. So press the following to change the size of your active document, Shift+F1 to Shift-F10 give 10 per cent to 100 per cent while Shift+F11 halves the current scale and Shift+F12 doubles it.

Before we leave cutting and pasting, let's see how to cut and paste between different documents. This time we'll work on an entire frame and its contents, which is what Impression does when there is no selected region of text.

Open a new document by clicking on the Impression icon on the icon bar, rescale the window to 40 per cent with Shift-F4 and then resize it so it occupies the right side of the screen.

If rescaling didn't work, click in its frame to make it the active document – remember to check that the title bar is light yellow in colour.

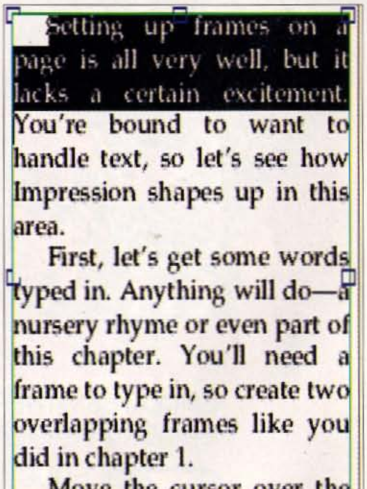
Now click in the text-filled frame on the left, copy it with Control+C, click in the large frame in the new document and press Insert or Control+V.

This time nothing seems to happen – but move the mouse slightly and cross hairs appear, indicating where the top right corner of the copied frame will be placed. Move them where you like, then complete the paste action by clicking Select.

Importing text

Although you can easily use Impression to type your document, you'll often want to use text already typed on some other word processor. So let's see how importing text is done using any sample text on the disc, preferably prepared with !Edit.

Click on the appropriate disc icon to catalogue the disc. Find a file of sample text – a ReadMe or !Help file will do – and drag its icon on to the frame on the right which you just created. You'll



Setting up frames on a page is all very well, but it lacks a certain excitement. You're bound to want to handle text, so let's see how Impression shapes up in this area.

First, let's get some words typed in. Anything will do—a nursery rhyme or even part of this chapter. You'll need a frame to type in, so create two overlapping frames like you did in chapter 1.

Move the cursor over the frame on top and click Select.

Figure I: Marked text, or selected region

Bruce Goatly continues his explanation of DTP by showing how text is handled with Impression

the words

find the text being read into it and new pages created automatically until there are enough to hold it all. Another time we'll look at how to flow text manually between frames you've added yourself.

The document on the right should now contain two completely unconnected pieces of text. Each is called a story, whether it occupies one frame or many. A document can consist of as many stories as you want, each with its own separate frame or linked set of frames.

Repulsive frames

Notice in Figure III that the imported text flows around the small frame. The reason is that text is being repelled from the frames borders.

You can experiment with this by clicking on the small frame, selecting the *Alter frame* option in the *Frame* submenu and changing the numbers in the *Repel* area. Clicking on OK with Adjust rather than Select after each change will leave the dialogue box on screen.

If you have Impression 2 you can make a clear white area inside the frame as well as outside by changing the inset values.

Finally, try clicking on both *Repel* buttons to turn the repulsion off. You can delete the small frame after youve finished – just click in it and press Control+X.

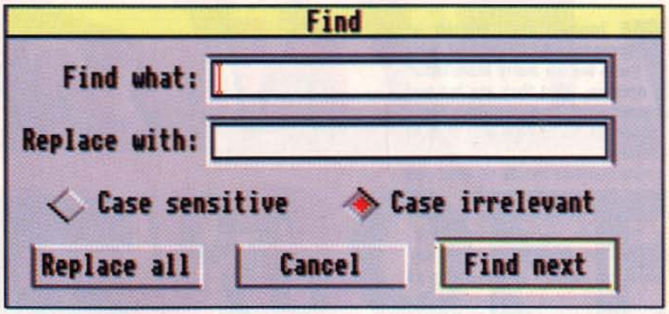


Figure IV: The Find And Replace dialogue box

Hide and seek

You may have come across search and replace options in other word processors or DTP packages. To access *Find* in Impression, first, move the caret to the top of the text and press Control+F4 to bring up the Find dialogue box, as in Figure IV.

Choose a word or phrase you know is in your document, press the down arrow or Tab or click in the lower text box – don't press Return yet.

Now type the word *publications* and click on the Find next button. With luck you should get a new dialogue box telling you the word has been found. To make the substitution, click on Replace. If you then get a message about not being able to find the search string, just click on Continue.

● *Next mont we'll look at making text more interesting with styles and effects.*

Key tip

In Impression a really easy way to rewrite a passage – without deleting – is simply to mark the unwanted text and type in your new version. The old matter will be cut to the clipboard, as you type the first letter.

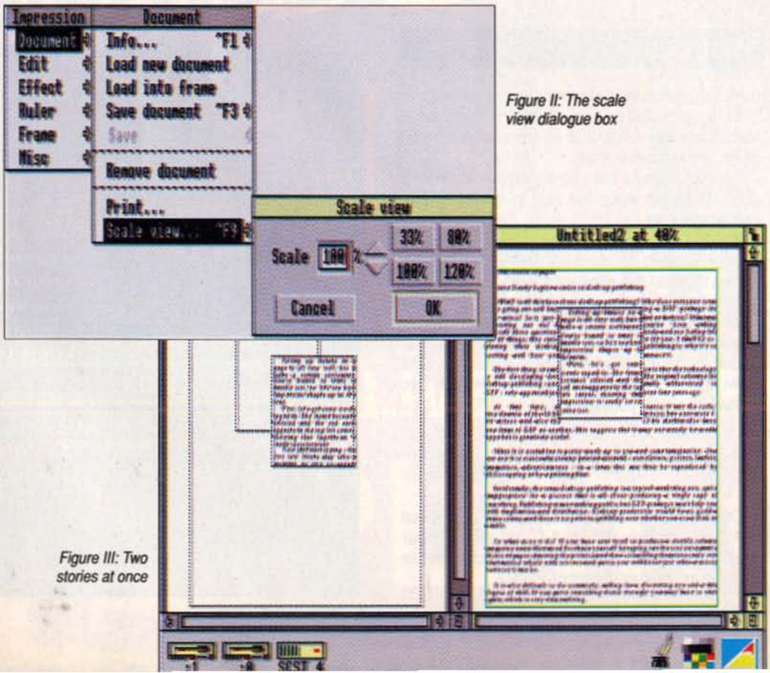


Figure II: The scale view dialogue box

Figure III: Two stories at once

Shortcuts

Impression also gives you quick key shortcuts to cut, copy and paste text, avoiding menu selections altogether:

Control+X	Cuts the text
Control+C	Represents copy text
Control+V	Pastes from the clipboard
Delete	Cuts text
Insert	Pastes text
Control+K	Deletes a marked region completely without putting it on the clipboard – use with extreme caution.
Control+A	Deletes a letter in the same direction as Copy – this is for compatibility with Wordwise and Inter-Word. The deleted letter isn't put on the clipboard
Control+S	Swaps capitals for lower case and vice versa.
Control+D	Deletes the whole word at the caret and puts it on the clipboard.

Now let's SUM up

WE looked last month at spreadsheets in general, why there are so many installation options, what they are for and how to set them up, plus some fundamental concepts as to how you should create a spreadsheet.

What comes next depends mostly on what you want to do and which package you are using.

An essential feature of spreadsheets is the ability to use functions. These are special purpose formulas which perform complex calculations in one simple step and make the modern spreadsheets so easy to use.

Minerva Software's Desktop Office has 12 such functions, while Colton Software's PipeDream 3 has more than 65 and Clares' Schema has around 75.

This is best explained by an example based upon the most rudimentary function which is available in all these – and other – spreadsheet packages: The SUM function.

Using our earlier example spreadsheet, we needed to add together various rows and columns to get the Total Sales Per Quarter and Total Sales Per Sales Person.

In the case of Michaelangelo his total sales for the year 1990 to 1991 could be put into the cell H7 with the formula D7+E7+F7+G7. The function SUM does this, but in a shorter and friendlier way.

Desktop Office	SUM(D7G7)
Pipedream 3	SUM(D7G7)
Schema	SUM(D7><G7)

Similarly for the Total Sales Per Quarter we could have put in cell D11 the formula D5+D6+D7+D8+D9+D10. SUM allows us to put into cell D11 SUM(D5D10) or in the case of Schema SUM(D5><D10).

Figure I also includes the Average Sales Per Person Per Month in cell G13. We could enter this in many ways such as :

```
(D5+D6+D7+D8+D9+D10+E5+E6+E7+
E8+E9+E10+F5+F6+F7+F8+F9+F10+
G5+G6+G7+G8+G9+G10)/24
```

or:

```
(D11+E11+F11+G11)/24
```

or:

```
(H5+H6+H7+H8+H9+H10>/24
```

If we had a function which carries out this averaging all we would have to do is enter into cell G13 AVERAGE(D5><G10). It can be found in Pipedream 3 and Schema.

Both of these examples make the package easier to use because they are effectively a shortcut.

However, imagine you now want to discover which of these sales figures is the maximum and which the minimum number. Fortunately, Desktop Office, Pipedream 3 and Schema all have these two functions built in.

```
MAX(D5><G10)
MIN(D5><G10)
```

These four examples – SUM, AVERAGE, MAX and MIN – are part of a group of functions which come under the general heading of array formulas. Adequate descriptions of other functions can be found in individual manuals, but I will briefly describe some of the other important groups you may find.

Algebra

Schema has over 25 functions in this area of which a large proportion are trigonometrical: SIN, COS, TAN, cotangent (COT) and so on. Their uses will be immediately apparent to those who enjoy this branch of mathematics.

Others in this heading include the calculation of the square root of a number (SQRT), the logarithm of a number base 10 (LOG) and base e (LN), the number *e* raised to the number power (EXP), the absolute value of a number (ABS), random number generation (RAND) and many more.

All the functions in this group take a numeric argument and give a numeric result.

Matrices

Conventional matrix algebra can be carried out over a spreadsheet using matrix functions. Matrices reside in blocks of the appropriate dimensions, one number to a cell.

These functions are slightly different, as they generate results which are sent to a whole set of cells at one time.

You can see what this means in Figure II. Here is a set of numbers in columns B and C rows 2 to 20. Added together the answers are placed in column D rows 2 to 20.

What happens is that B2 (source matrix A) is added to C2 (source matrix B) and the answer placed in D2 (destination matrix) and so on right down to B20 plus C20 with the answer in D20. This is done by simply putting into cell A1:

```
MATADD(B2><B20,C2><C20,D2><D20)
```

Other matrix formulas include matrix subtraction (MATSUB), multiply (MATMULT) and solving linear equations (MATSOLVE) which you can find in Schema as standard functions.

Financial functions

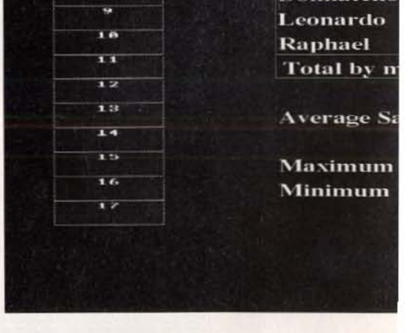
These are all concerned with the transfer of money at regular intervals in contracts which last for an extended period.

A few examples from Schema are: The number of periodic payments needed of a constant amount, given a constant interest rate (NPER), Straight line depreciation of an asset for one period (SLN), Future value of an ordinary annuity (FV) to name a few.

Let's take a worked example: You propose to save a fixed amount of money each year, under the arrangement that the capital, plus the compounded interest is to be repaid at the end of the contract.

The fixed annual interest rate is 13 per cent and you pay £3,000 annually for 20 years. To discover how much you would be likely to receive at the end of the term you would use the following:

Schema	FV(.13,20,-3000)
PipeDream 3	FV(3000,0.13,20)



Examination of the use of spreadsheets on the Archimeds

Statistics

The functions in this group all help to predict missing data by fitting curves to existing data, and using the least squares criterion to obtain the best fit. There are the two basic models: Linear and exponential.

The linear model assumes that the best fit to a group of points (x0,y0),(x1,y1)....(xn,yn) is a straight line of the form y = mx+c where *m* and *c* are constant coefficients determined by the least squares process.

The exponential model assumes that the best fit to the group of points is an exponential curve of the form bxy = ae where *a* and *b* are constants.

Functions which are included within Schema are Gradient, Intercept and Prediction and are entered in the format GRADIENT(block,number) where *number* is 0 for linear and 1 for exponential.

Strings

This group does some form of basic computational conversion upon a string or number. For example CHR(number) converts a number into Ascii string equivalent CHR(61) = Q. While LOWER(string) converts a string to lower case and UPPER(string) converts a string to upper case UPPER("fred") = FRED.

Time

Schema has a very quaint way of storing time: In seconds after midnight on February 29th 0 BC. The reasoning for this is that there is a false but useful assumption that the Gregorian calender can be extended back to that time without irregularity with the leap second at the end of 1987 ignored.

For those who are more interested in the date now – based upon the information gained from our computer's real time clock – PipeDream 3 has a function called Date and Schema one called NOW().

By the way, with Schema if you hadn't done anything clever with the Picture Style you would probably have got something like 62817520459 – the number of seconds since the beginning of the Gregorian calender.

You could have asked for YEARS(NOW()) which would have given you 1991.

Other functions in this group include adjusting this temporal value by seconds, hours, days, months, years and so on.

When using Schema it's worth remembering that a spreadsheet cell can contain not only any one of these functions but also a mix of them. For example, if you wanted the square root of a group of cells then you can mix these two functions.

```
SQRT(SUM(B2><J2))
```

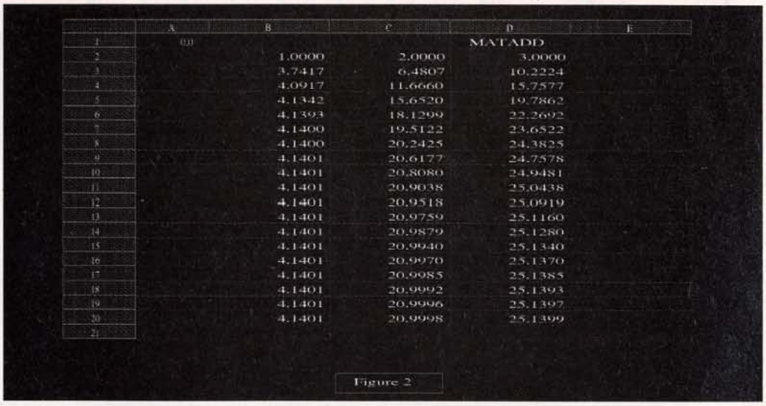
Constants

Extremely useful is the ability to define global constants. Imagine a spreadsheet where you carry out various calculations in several different places with such constant items such as VAT, dollar rate, yen rate, pi and so on.

Now imagine what would happen if for some reason or another the dollar rate changed. If we were not able to define this constant externally it would be very time consuming.

For example, in a spreadsheet containing items purchased from the USA it would be very useful to follow the rate of change of the dollar and also to produce "What If" scenarios based on expected dollar rate changes such as "What are my profit margins if the dollar rate goes up and down between these limits?"

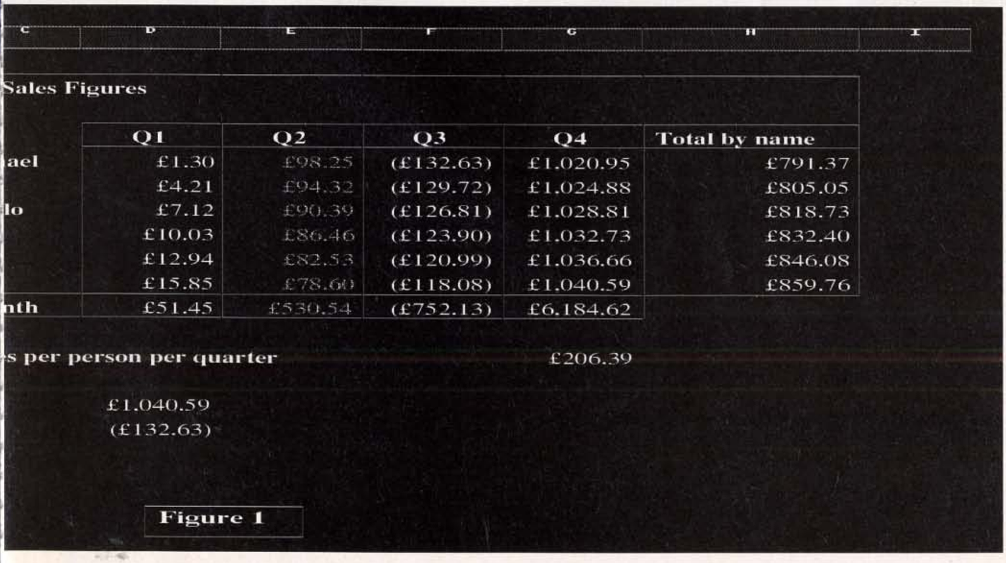
● *Next month we'll look at the many styles and format variations available within spreadsheets.*



	A	B	C	D	E
1	0.0			MATADD	
2		1.0000	2.0000	3.0000	
3		3.7417	6.4807	10.2224	
4		4.0917	11.6660	15.7577	
5		4.1342	15.6520	19.7862	
6		4.1393	18.1299	22.2692	
7		4.1400	19.5122	23.6522	
8		4.1400	20.2425	24.3825	
9		4.1401	20.6177	24.7578	
10		4.1401	20.8080	24.9481	
11		4.1401	20.9038	25.0438	
12		4.1401	20.9518	25.0919	
13		4.1401	20.9759	25.1160	
14		4.1401	20.9879	25.1280	
15		4.1401	20.9940	25.1340	
16		4.1401	20.9970	25.1370	
17		4.1401	20.9985	25.1385	
18		4.1401	20.9992	25.1393	
19		4.1401	20.9996	25.1397	
20		4.1401	20.9998	25.1399	
21					

Figure 2

Figure II: Handling matrices



C	D	E	F	G	H	I
ales Figures						
	Q1	Q2	Q3	Q4	Total by name	
ael	£1.30	£98.25	(£132.63)	£1.020.95	£791.37	
	£4.21	£94.32	(£129.72)	£1.024.88	£805.05	
lo	£7.12	£90.39	(£126.81)	£1.028.81	£818.73	
	£10.03	£86.46	(£123.90)	£1.032.73	£832.40	
	£12.94	£82.53	(£120.99)	£1.036.66	£846.08	
	£15.85	£78.60	(£118.08)	£1.040.59	£859.76	
nth	£51.45	£530.54	(£752.13)	£6.184.62		
s per person per quarter				£206.39		
	£1.040.59					
	(£132.63)					

Figure 1

Figure I: Adding up the columns

DATABASES

LAST month's article described a database as a collection of items of information (fields) which describe some sort of entity (a record). Now we'll look at the information needed to set up a simple database – one to manage the membership records of a small club.

Remember, such a database may come within the scope of the Data Protection Act and must be registered unless it is for a small unincorporated club.

Getting information into a database is probably the hardest thing about using one. It takes a long time to type in, so it's important to be clear about exactly what is wanted from a database before setting it up. Many packages don't easily allow the structure to be changed once a file has been created.

The practicalities

Think back to the analogy of a box full of index cards. A basic database has a record, or card, for each member, with fields for individual items of data about that member.

Suppose that the club is the Sportytown Youth Group, the information that we need to store about each member might be:

```
Name
Address
Telephone number
Date of birth
Male or female
Date of subscription renewal
Membership of any sub-groups (table tennis,
swimming and so on)
```

The most common, and simplest, use of a database is to browse through, looking at the individual members' records and noting down details as required, very much the sort of thing you would do if the information was on index cards.

However, that does not make full use of the computer's power of the computer, which can do the search itself, presenting the data in ways that are directly useful.

Many such applications involve mailmerging data into a wordprocessor document, or presenting the data in tabular form.

For our youth group some uses might be:

Sub-group meeting notification: The names and addresses of all of members of a particular sub-group, say ramblers, can be extracted from the file and used as data for a mailmerge letter.

Creating a stan

PipeDream

You may not have thought of PipeDream as a database, most people use it either as a wordprocessor or a spreadsheet. But because it can do all three it's well worth considering.

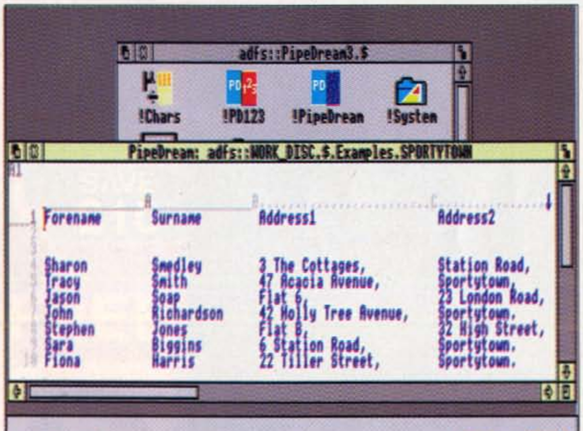
On the plus side, PipeDream owners will find they've got a database for no extra cost, and users familiar with the package will already know nearly everything that's needed to use it as a database, there's no need to learn how to use a whole new item of software from scratch.

However, on the minus side, the standard spreadsheet display is cluttered and harder to digest than a specially designed database display.

The principle is quite simple. Each row can contain a record, with the columns within each row holding individual fields. This means that each member of the club will have their own row and the information will appear rather like a table.

The entries can be easily sorted into alphabetical order, but it should be noted that in order to manipulate the data PipeDream holds everything in memory, so the size of a file is limited by the capacity of your computer, not too much of a restriction in most cases.

If you need to insert a new field in every record after a database has been created, this can easily be done by inserting a column in the appropriate place and saving the file.



Forename	Surname	Address1	Address2
Sharon	Smedley	3 The Cottages,	Station Road,
Tracy	Smith	47 Acacia Avenue,	Sportytown,
Jason	Soap	Flat 6,	23 London Road,
John	Richardson	42 Holly Tree Avenue,	Sportytown.
Stephen	Jones	Flat B,	32 High Street,
Sara	Biggins	6 Station Road,	Sportytown.
Fiona	Harris	22 Tiller Street,	Sportytown.

Pipedream layout

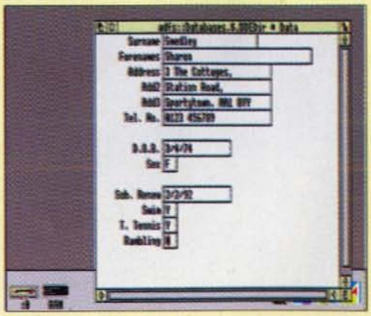
The most popular packages for the Archimedes

Squirrel

Although Squirrel is conventional in appearance it uses Risc OS facilities well, with each record shown on the screen as separate cards.

Creating a database is simple. The mouse is positioned at the point where a field should start and dragged to the finish point. Release the button and a dialogue box appears requesting details about that particular field.

Repeat the process for each field, save the finished result, and the database is ready to use. Complex reports will require an external wordprocessor though.


Surname Smedley
Forenames Sharon
Address 3 The Cottages,
Add2 Station Road,
Add3 Sportytown. [illegible]
Tel. No. 0123 456789
D.O.B. 3/4/74
Sex F
Sub. Renew 2/2/92
Swim Y
T. Tennis Y
Rambling N

A Squirrel record

Taking the bull by the horns, John Allen guides you through the intricacies of your data management

Subscription reminder: The database is searched for all members whose subscription is due within the next month and a file created with their names and addresses to be mailmerged into a standard reminder letter and printed on address labels.

Select potential members of a girls' under-15 hockey team: Search the database for all members who are both female and have a date of birth less than 15 years before the current date. This could be further refined by excluding girls who are under 13.

Once you've decided what you want in your database and what uses you plan to put it to, you need to choose the most appropriate database. In the panel is a summary of the most popular packages available for your 32 bit Acorn machine.

● *Next month we'll look in more detail at the best way to build your database and input data.*

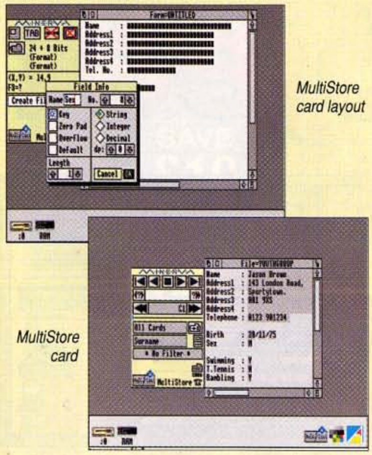
dard database

MultiStore and Flexifile

These related packages – Flexifile is a cut-down version of MultiStore – are much more conventional. They only show one record at a time, which fits better with the card index analogy, especially since they call each record a card.

However, because they are not integrated packages it is necessary to use a separate wordprocessor such as 1st Word Plus for mailmerging. Having said that the latest version of MultiStore uses the Impulse messaging system and can be used with Impression 2 for mailmerging and other uses.

You must set up the format of each card using a dialogue box, it is very difficult to change the form of the data later so it is important to include everything correctly at the start.



MultiStore card layout

MultiStore card

File=YOUTHGROUP

Name : Jason Brown
Address1 : 143 London Road,
Address2 : Sportytown.
Address3 : AA1 9XS
Address4 :
Telephone : 0123 901234

Birth : 28/11/75
Sex : M

Swimming : Y
T.Tennis : N
Rambling : Y

Form=UNTITLED
Name
Address1
Address2
Address3
Address4
Tel. No.
24 + 8 Bits
(Format)
(Format)
Field Info
Name Sex
No.
Key
Zero Pad
Overflow
Default
String
Integer
Decimal
dp:
Length
Cancel
Create Fil
All Cards
Surname
* No Filter *
MultiStore
RAM

Iota Junior Database

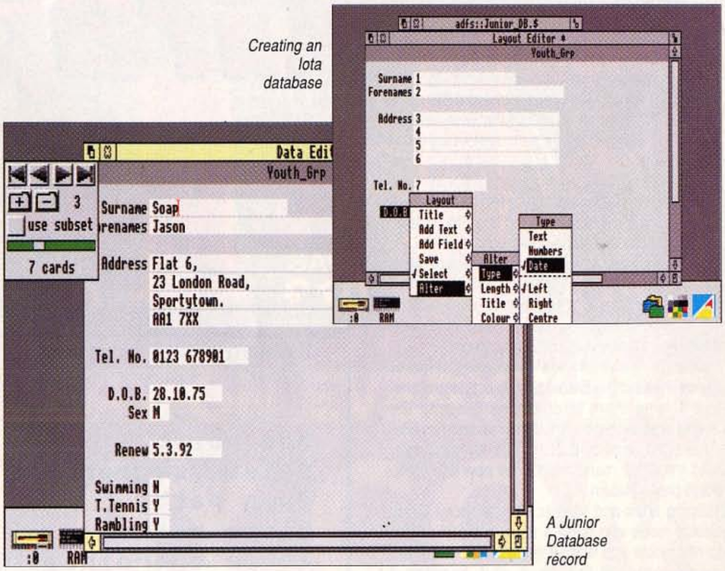
This package is worthy of consideration because it is much cheaper than the others. Nevertheless it still has much of the power of a full database.

The software will draw graphs and produce reports, but there's no explicit way to produce files suitable for mailmerging into a wordprocessor.

However it is possible to save some fields of a selection of records is a file with each field separated by either a comma (CSV) or a tab character (TSV) which is suitable for 1st Word Plus or PipeDream respectively.

A big plus of this straightforward package is that it is possible to change the layout of each card of a database in use, even adding or deleting fields. This provides a degree of future proofing for any database created.

Creating a new database is simple, making full use of the Risc OS environment of the Archimedes and BBC A3000.



Creating an Iota database

A Junior Database record

Surname Soap
Forenames Jason
Address Flat 6,
23 London Road,
Sportytown.
AA1 7XX
Tel. No. 0123 678901
D.O.B. 28.10.75
Sex M
Renew 5.3.92
Swimming N
T.Tennis Y
Rambling Y

adfs::Junior_DB.$
Layout Editor *
Youth_Grp
Surname 1
Forenames 2
Address 3
4
5
6
Tel. No. 7
Layout
Title
Add Text
Add Field
Save
Select
Alter
Alter
Type
Length
Title
Colour
Type
Text
Numbers
Date
Left
Right
Centre
Data Edi
Youth_Grp
3
use subset
7 cards
RAM

Graphics by object

TO start this session load your drawing of a BBC A3000 from last month into !Draw and check that the paper limits are still A4 vertical and that your Grid setting is still set on Inch 1x10.

When making small adjustments or adding small details to your drawing of the A3000 use the Zoom magnifier option to give a close up view of the area you are working on, setting the scale to something like 4:1.

To do this move the red vertical line – the carat – to the end of the number you want to change, use the Delete key to remove it, type in a new number and press Return.

One problem I had with my drawing of an A310 was that I couldn't get enough detail into the disc drive slots – these are wider at the right as the gridlock had the lines set at 1x10.

If you want finer resolution on your chosen grid to get a bit more detail or have lines closer together change the Spacing setting under the Inch option on the Grid menu to 0.05 instead of 1.0, bypassing the 1x10 option.

This will give you a grid spacing of 1/20th of an inch instead of 1/10th as set by the 1x10 option and will immediately double the grid resolution.

Rather than trying to draw two solid rectangles for the disc drive slot, I used a thick line for the main slot and an even thicker line overlaying the right hand part of the horizontal line to give a reasonable representation.

If you examine the Line Width option under the Style menu then you'll notice that your drawing so far has been in Thin lines.

The Thin setting gives you the finest line available to work with and is a bit faint when printed out – the 0.25 line setting is probably better.

It doesn't really matter which you use, as the thickness of all lines and objects can be changed at any stage.

To do this you must be in Enter mode, then select line width from the Style menu and select a suitable line width – 3 in my case for the main line and 8 for the thick right hand end.

This is done by moving the pointer down the list of settings to the bottom. This will reverse highlight the bottom fixed line width setting of 4 but the carat will move to the right hand end of the user defined setting, which will be 0.00 if it's the first time you've used the option.

Delete this and type in your own line width and press Return. Any new line drawn from now on will be in the new thickness. All the old lines will stay at the old thickness but can be changed if required.

This is one of the advantages of programs such as !Draw. All elements of a drawing can be changed at any time in a number of ways without having to redraw anything, leaving you to experiment with line thicknesses, fills and colours.

To change the thickness of existing lines or groups of lines simply Select the object or group of objects turning them to dotted outline with the rotate and rescale ears – small red outline squares – on the right hand end of the line or rectangle. Move to the Style menu, select the new line thickness and press Return.

Grouping lines and objects can be tricky. Enter the Select mode and band a rectangle around the group of objects you want. Press Select in the top left hand corner of the group and, keeping it pressed, move it to the bottom right hand corner of the group, trailing a light grey rectangle behind the pointer.

Release Select. You should now have a whole series of dotted outlined objects with red ears. Move to the Select menu and down to Group. Click on this option and the objects will be combined into one object which can be moved or rescaled.

This means that you can't work on any previously individual line or object. If you alter line widths with a group selected everything in the group will be altered, which can be annoying. However, the grouping process can be reversed by reselecting at any time and using the Ungroup option.

Problem areas can occur when you press the Select button too near an object and end up moving it across the screen rather than banding a box round a group of objects.

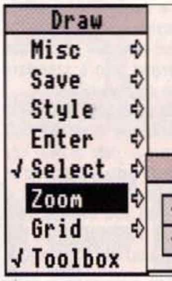
It's not always easy to put it back in exactly in the right place but you should be OK if you have the gridlock set. Always save first if you think you might have problems.

Opting out

The other two options available in the Style menu are Line Pattern and Join. The former determines whether lines are solid, dashed in three lengths or a combination of dashed and dotted. I had no use for these in this particular drawing but they will be used elsewhere.

The Join option allows you to determine whether the corners at which lines join are mitred, round or bevelled. None of the corners on the A310 are sharp, so I selected the round corner option.

This only shows up on large printouts or on thick lines, and is hardly worth the bother but it's nice to know that you can have rounded corners if you want them. The only time I used curves was for the inner edge of the screen. This can be a bit tricky, but there are ways of making things easier.



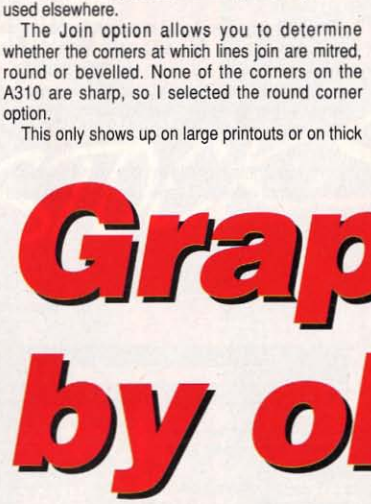
The zoom tool

Remember that curves differ from straight lines in that they have two additional yellow control points over and above the two light blue control points at the end of each line.

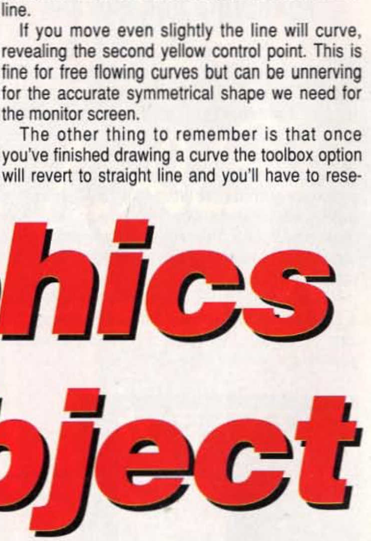
To draw a curve select Curve from the Enter menu and press the Select button. A red line will be banded with a yellow control point somewhere along the line. Press Select again to complete the line.

If you move even slightly the line will curve, revealing the second yellow control point. This is fine for free flowing curves but can be unnerving for the accurate symmetrical shape we need for the monitor screen.

The other thing to remember is that once you've finished drawing a curve the toolbox option will revert to straight line and you'll have to rese-

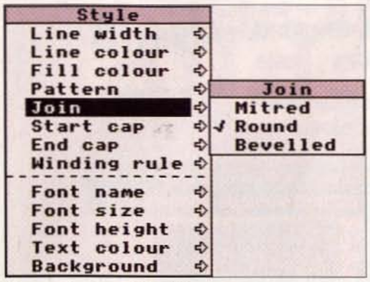


Changing the shape of curves

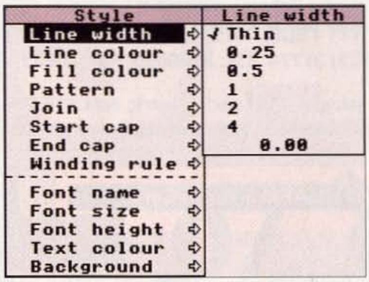


The final version at different sizes

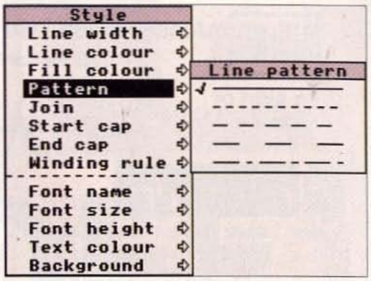
Steve Bruntlett continues his step-by-step guide to computer aided drawing


Style
Line width
Line colour
Fill colour
Pattern
Join
Start cap
End cap
Winding rule
Font name
Font size
Font height
Text colour
Background
Join
Mitred
✓ Round
Bevelled

Lines can have a variety of joins...


Style
Line width
Line colour
Fill colour
Pattern
Join
Start cap
End cap
Winding rule
Font name
Font size
Font height
Text colour
Background
Line width
✓ Thin
0.25
0.5
1
2
4
0.00

line widths...


Style
Line width
Line colour
Fill colour
Pattern
Join
Start cap
End cap
Winding rule
Font name
Font size
Font height
Text colour
Background
Line pattern

and patterns.

lect Curve. An alternative way to draw a single curved line is to draw a straight line and press Adjust on the bottom light blue control point to turn it red. If you then press the Menu button you'll pop up an Edit menu, which among other things will allow you to change your line to a curve.

Select this option and the two yellow control points will be added to the straight line. Press Adjust and move them a little way to the side, below or above depending on which curved edge you are trying to draw.

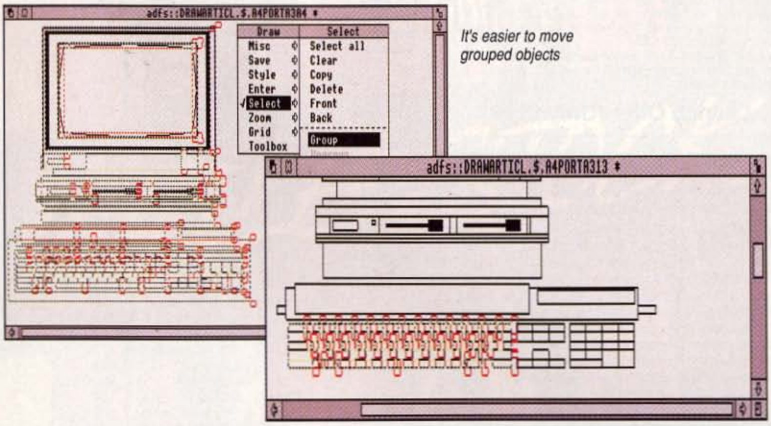
Moving the yellow control points at right angles to the line will give a smooth start to the curve. Moving them towards the end of the line will make the curve's start much more acute.

Practise a few curves independently of the A3000 drawing. You can then move these into position once you're happy with the general shape.

You only need to draw the top and right hand curves, as you can use the Select menu to copy them. Then either use the Rotate option set to 180 to make the right hand and bottom curves or use Scale -1 to flip – the Scale option is more accurate.

● *Next month I'll deal with the production of business cards and typefaces. If you've successfully completed the drawing of your A3000 have a go at something with a few more curved lines to get used to that option.*

And if you're really keen have a go at drawing a proper keyboard with lettered and numbered keys.


adfs::DRAWARTICL.$.A4PORTA304 *
Draw
Misc
Save
Style
Enter
✓Select
Zoom
Grid
Toolbox
Select
Select all
Clear
Copy
Delete
Front
Back
Group
adfs::DRAWARTICL.$.A4PORTA313 *

It's easier to move grouped objects

Useful pointers

I spent a lot of time working on getting the key grid on the keyboard as accurate as possible, much of it waiting for the grid to redraw every time I made an alteration. Time is saved if you reduce the drawing area to cover the small part you're working on. The keyboard worked out far too long because I'd made the keys too wide.

This was no problem, as the whole keyboard was selected and the objects grouped before rescaling as a single object.

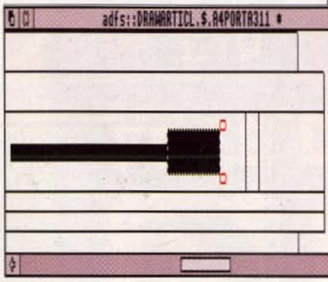
The only problem in doing this is that the lines no longer correspond to the gridlock setting. So make sure you've done all the detailed work before you start rescaling.

Another good idea when doing this kind of thing is to save your work before you rescale any part of the drawing just in case you change your mind.

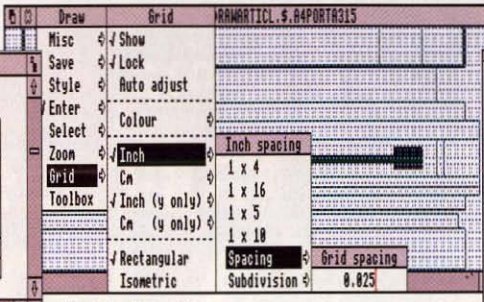
It is advisable to group the blocks of keys, as they are then much easier to manipulate. For example, I missed out the row of red function keys and had to remove the outline of the keyboard and move the groups of keys down to make room.

If I hadn't grouped the keys I would have had to move them individually.

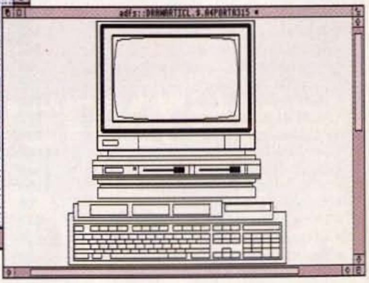
Finally, you should print out your work as you go along to see how much detail is showing, otherwise you can spend hours drawing detail that just merges together. Try printing out your work at varying sizes from full to stamp size to see what I mean.


adfs::DRAWARTICL.$.A4PORTA311 *

Creating the disc drive


RAWARTICL.$.A4PORTA315
Draw
Misc
Save
Style
Enter
Select
Zoom
Grid
Toolbox
Grid
✓ Show
✓ Lock
Auto adjust
Colour
✓ Inch
Cm
✓ Inch (y only)
Cm (y only)
✓ Rectangular
Isometric
Inch spacing
1 x 4
1 x 16
1 x 5
1 x 10
Spacing
Subdivision
Grid spacing
0.025

Controlling the grid lock


adfs::DRAWARTICL.$.A4PORTA315 *

The final drawing

Watford Electronics

(A member of the Jessa group of Companies – Established 1972)

Jessa House, 250 Lower High Street, Watford WD1 2AN, England
Tel: Watford (0923) 37774 Tlx: 8956095 Fax: (0923) 33642

The sign of Quality

Shop Hours: 9am to 6pm (Mon.-Sat.) Thursday 9am to 8pm. FREE customer car park.
All prices exclusive of VAT; subject to change without notice & available on request.

Acorn

The choice of Experience

Archimedes micro

System	Basic	Mono	Colour	Multiscan
410/1	£1099	£1159	£1269	£1448
420/1	£1299	£1359	£1469	£1648
440/1	£1699	£1759	£1869	£2048
540/1	£2995	£3065	£3169	

12 MONTHS FREE MAINTENANCE ON SITE

Archimedes A3000

- A3000 Microcomputer **£599**
- A3000 + Learning Curve pack **£699**
- 3.5" External Drive **£99**
- Monitor Stand **£16**
- Technical Manual **£60**
- SCSI Card **£149**
- A3000 Dust Cover **£5**
- Serial Upgrade **£17**
- A3000 plus Monitor Dust Cover **£9**
- A3000 User Port/Midi Upgrade Card **£44**
- A3000 User/Analogue/IIC I/O Card **£42**
- A3000 External Podule Case **£13**

Unbeatable Sale Offers on Archimedes Micro

When you purchase an Archimedes Micro from Watford, look what you get FREE with it

Micro	Free Offer
A410/1	Upgraded to 2MB RAM & 44MB IDE Hard Drive
A420/1	Upgraded to 4MB RAM & 100MB IDE Hard Drive, MkII Learning Curve pack incl. Acorn DTP pack
A440/1	High Res 14" Multiscan Colour Monitor
540/1	High Res Multiscan Monitor & Panasonic KX-P1180 Printer
A3000	Upgraded to 2 Megabyte of RAM & a A3000 Monitor plinth.

+ 12 months FREE On-Site Maintenance

(P.S. Instead of the above Hardware upgrades on A410/1 & A420/1, we will fit the 30MHz Turbo Board if required. Please specify your requirement when ordering.)

Archi Accessories

- NEW Multitasking RISC OS £29
- 3.5" 800K 2nd Floppy Drive (305/310) £118
- 5.25" 800K external Floppy Drive £85
- I/O Podule (Analogue/User/1MHz bus) £79
- I/O Podule (Analogue/User/IIC Ports) £42
- MEMC 1A Upgrade £42
- MIDI add-on to I/O Podule £27
- MIDI Expansion Card £65
- Sound Sampler Mono (Armadillo) £129
- Sound Sampler Stereo /Midi (Armadillo) £186
- Chromalock Podule (Wild Vision) £275
- Econet Network Board £42
- Archimedes IEEE Interface Adaptor £269
- Dual RS232 Podule £195
- 16 bit parallel I/O Card £195
- Archi replacement mouse – New design £32
- PC Emulator NEW Faster Version £85
- Software Developers Toolbox £149
- Floating Point Unit £455
- SCSI Adaptor Expansion Card £162
- Keyboard Extension Lead £6
- 2 Podule Backplane £25
- 4 Podule Backplane £38
- Fan for above backplanes £8
- Risc Os Extras Software Disc £5
- Smoked Perspex Low profile Keyboard Cover £8
- Ethernet Card £220

NEW

ARM 3 Turbo Card

Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £199. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £35.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

Launch Offer: Only £199

Archimedes RAM Upgrade

All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R302**-A3000 – to 2MB RAM Upgrade £39
- **R303**-A3000 – to 2MB RAM Upgrade (expandable to 4MB) £69
- **R304**-A3000 – to 4MB RAM Upgrade £159
- **R311**-A305 – to 1MB RAM Upgrade £50
- **R312**-A305/310 – to 2MB RAM Upgrade £215
- **R314**-A305/310 – to 4MB RAM Upgrade £405
- **R412**-A410/1 – to 2MB RAM Upgrade £35
- **R413**-A420/1 – to 4MB RAM Upgrade £64
- **R414**-A410/1 – to 4MB RAM Upgrade £98
- **R810**-A410/1 – to 8MB RAM Upgrade £599
- **R820**-A420/1 – to 8MB RAM Upgrade £569
- **R840**-A440/1 – to 8MB RAM Upgrade £499
- **R814**-R140 – to 8MB RAM Upgrade £499

Archimedes Hard Disc

Watford's ST506 Hard disc drives for A310 & A410 series fit internally into the space provided. The 'simple to follow' fitting instructions supplied makes drive fitting very easy. All disc drives are auto parking. 40Meg & 53Meg drives are fast 24mS type, while 20MHz are 28mS.

P.S. A310 upgrades require a backplane and a fan.

- **3HDP** – Hard Disc Podule only £135
- **3HD20** – 20Meg H' Disc + Podule for 310 £235
- **3HD40** – 40Meg H' Disc + Podule for 310 £345
- **3HD50** – 53Meg H' Disc + Podule for 310 £474
- **4HD20** – 20Meg Hard Disc for 410 £129
- **4HD40** – 40Meg Hard Disc for 410 £215
- **4HD50** – 53Meg Hard Disc for 410 £335
- A3000 20Meg Hard Disc + Podule £299
- A3000 40Meg Hard Disc + Podule £429

For IDE Hard Disc turn to page 14

Convert your Archi 410 to a 420 or 440 with Watford's unique Upgrade Kits

UP10	to 2MB RAM + 20MB Hard Disc	£165
UP15	to 2MB RAM + 40MB Hard Disc	£252
UP20	to 4MB RAM + 20MB Hard Disc	£232
UP30	to 4MB RAM + 40MB Hard Disc	£318
UP40	to 4MB RAM + 53MB Hard Disc	£438

Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Graphics, Art, Design & Games

GRAPHICS	
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
HotLink Presenter	£40
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Render Bender	£58
Snippet	£21
Tween	£21

GAMES	
ArcPinball	£18
ARCticulate	£19
Apocalypse	£15
Arcade 3 Compil.	£12
Arcade Soccer	£15
Arc Pinball	£18
Arc Trivia	£18
Avon	£16
Ballerina	£14
Blowpipe	£16
Boogie Buggy	£19
Break 147	£19
Bug Hunter	£14
Caverns	£14
Chess 3D	£14
Chocks Away	£14
Chocks Away Extra	£14
Conqueror	£18
Cops	£14
Corruption	£18
Crisis	£21
Drop Ship	£12
Enthar Seven	£21
E-Type	£14
E-Type Designer	£13
E-Type Extra 100 miles	£13
Family Favourites	£15
Fireball 2	£19
Gumshoes	£19
Holed Out Designer	£13
Holed Out Golf	£13
Hostages	£15
Ibix the Viking	£14
Inertia	£13
Inter Dictor 2	£26
Iron Lord	£15
Jet Fighter	£10
Jiglet	£25
Jigsaw	£27
Magpie	£39
Man at Arms	£16
MahJong Patience	£15
Manchester United	£19
Nevryon	£14
Olympics	£15
Pipe Mania	£17
Pirate	£16
Power Band	£18
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£15
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Redshift	£14
Return to Doom	£16
Revelation	£54
Repton 3	£15
Rotor	£19
Saloon Cars	£19
Splice	£25
Sporting Triangles	£24
Star Trader	£14
Superior Golf	£15
Super Pool	£19
Talisman	£12
The Pawn	£19
Thundermonk	£11
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic	£15
White Magic 2	£15
Wimp Game	£13
Worldscape	£16

Miscellaneous	
Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
BBC DFS Reader	£6
Broadcaster Loader	£65
Equasor	£40
FlexiFile	£98
Genesis	£65
Genesis 2	£113
Hearsay Comms Pack	£50
Investigator 2	£22
JX Archi Colour Printer Driver for Citizen & Star	£15
Numerator	£66
Presenter 2	£35
Presenter Story	£145
Rainforest	£17
Revelation	£58
Rhapsody in Blue 2	£45
Speech!	£15
The Victorian	£17
Toolkit (Clares)	£35
Touchtype	£40
Tracer	£46

Staff Vacancy

Watford Electronics are inviting Hardware and Software engineers to apply for positions in their new R & D team. Hardware engineers must be familiar with the Archimedes architecture and able to follow a project from conception to production. Software engineers should be proficient in ARM assembler or Acorn C, and able to write RISC OS applications and module code. Applicants should be well motivated and show experience in relevant areas. Qualifications are not as essential as your ability to produce innovative solutions to challenging problems. As a new member of the team you will be in a unique position to develop your career in a rewarding environment.

In the first instance forward your CV to Shiraz Jessa or Chris Honey.

Desk Top Publisher

Acorn's Archi DTP Package	**£108**
Impression 2 DTP Pack	**£130**
Impression Junior	**£72**
Tempest DTP Package	**£90**

Archimedes New Launch
See Pages 2, 3 & 14

Archi Wordprocessors

Pendown Archi	£48	Archie Spell Master	£25
Wordwise + Disc	£24	PD Spellchecker	£40
Image Writer	£25	View	£45
Interword Disc	£24	Graphic Writer	£19
1st Word Plus – 2	£63	EasyWord	£30

Databases

AlphaBase	£36	Multistore	£195
Knowledge Organiser	£42		

Spreadsheets

Intersheet Disc	£24	Viewsheet	£45
Sigmasheet	£39	Schema	£89

Business Graphics

GammaPlot	£39	Sigmaplot	£39
Interchart Disc	£17		

Integrated Packages

- Logistix £79
- Pipedream 3 £119
- Desktop Office – Database, Graphs & Charts, Wordprocessor Spreadsheet, Communications £98
- Desktop Folio – Wordprocessor, Desktop & Interactive Publishing. Ideal for school environment. £85

A3000 I/O Card
(User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

The card is provided with an extensive manual explaining installation, all software commands, connector pin outs, hardware addresses and example programs.

Features
- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Can you afford to miss the Array of New products for the Archimedes Micro from Watford Electronics making their first public appearance at the BBC Acorn User Show? Our technical team will be pleased to demonstrate any of these products.

- A3000 ARM 3 Turbo Upgrade
- User port/Analogue & IIc Card
- A4 B&W Flatbed Hand Scanner
- Archi Colour Flatbed Scanner
- Archi Colour Hand Scanner
- Advanced Graphics Card
- VIDC Enhancer Boards
- IDE Hard Disc Controller Card
- IDE Plug-in Hard Card
- Infra Red Remote Control Mouse
- Aries AlphaScan Multisync Monitor

Silicon Vision

Gerber Plot	£95	Solids Render	£120
Solid CAD	£120	Solid Tools	£279
Super Plot	£28	Data Vision	£110
Super Dump	£22	Share Holder	£135
Arc PCB Professional			£275
Realtime Solids Modeller			£136

NEW

Archimedes A300/A400 SCSI Hard Disc Offer

(while stocks last)

100MB Hard Disc Upgrade complete with Controller card, Cables, Formatter and Manuals

RRP: £999

Offer Price: £399

Archimedes to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

New RISC OS Version **Only £15**

Archimedes External Disc Drive Interface

With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

- A300/A3000 £21
- A400 £25

Special Education Prices

All education establishments qualify for special education prices on micros, etc. Please write in or telephone (0923) 37774 or 50335 for written quotation.

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77			£77 each
Assembler; LISP; Prolog X			£149 each
ANSI C Rel. 3	£125	BASIC Compiler	£77
Cambridge Pascal	£60	Logotron Logo	£45
Macro Assembler	£40	Risc Basic	£120
Robo Logo	£69	Risc FORTH	£110

Minerva's Archimedes Software

Home Accounts*	£36	Sales Ledger*	£53
Stock Manager*	£53	Purchase Ledger*	£53
Nominal Ledger*	£53	Reporter	£29
Ancestry	£59	Mailshot*	£29
System Delta+	£55		
System Delta + Reference Manual			£25
Order Processing/Invoicing*			£53
School Administrator			£118

** Requires System Delta*

NEW Business Accounts Packages
Nominal Ledger, Order Processing/Invoicing, Purchase Ledger, Sales Ledger & Stock Control
Price: £78 per Module or
£299 for the complete Software Suite

ULTIMUM – Archimedes A3000 Podule Racking System

THE ONLY LOGICAL WAY TO EXPAND YOUR A3000 COMPUTER

The accepted standard for Archimedes computer expansion is the Acorn Podule, designed initially to fit the old 310, and also for the later A400 and A400/1 series micros. The podules fit inside these computers up to four at a time. The A3000 is the little brother of the family, but can only have one podule at a time, plugging into the back of the computer.

Other attempts have been made to expand the A3000 by trying to introduce a 'mini-podule'. This is impractical for many reasons, amongst which is the reluctance of manufacturers to produce them. Nobody wants to re-design podules already produced. Some cannot be produced on a 'mini-podule' as they are far too complicated and simply wouldn't fit.

Watford Electronics listens to the demands and requirements of its customers, and we are glad to say that we have come up with the only real solution to the A3000 expansion problem. The ULTIMUM Podule Racking System allows up to three FULL SIZE standard Archimedes 300/400 series podules to be fitted to the computer. In addition, there is also provision for a hard disc drive and a podule to be fitted internally.

Since the ULTIMUM Podule Racking System takes proper full size podules, you will be able to use any of the currently available peripheral equipment, from companies like Computer Concepts, Armadillo, Acorn and of course, our own brand.

Fitting the podules to 'ULTIMUM' is simple. They are neatly fitted inside the metal case of the rack, avoiding the previously untidy method of hanging the podule off the back of the computer, risking damage to both, it and to the computer.

'ULTIMUM' has its own power supply, so no strain is put on the A3000 power supply. There is also an IEC mains output socket for an Acorn type monitor so reducing the number of plugs required to go to the mains. The ULTIMUM is rigidly clamped over the top and under the computer, and allows direct access to the floppy disc drive and reset button, rather than obstructing access as on other systems. The mounting method employed is so firm that the computer could even be safely transported without the assembly falling apart.

Price: £125

Continued→ → → → → → → → →

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£399**

FREE OFFER

A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

Gemini's OFFICE MATE & OFFICE MASTER packages on Disc consisting of: Database, Spreadsheet, Beebplot graphics. Accounts packs: Cashbook, Final Accounts, Mailist, Easyledger, Invoice & Statements, Stock Control.

FREE with every BBC Master purchased from us during October

ADD-ONs & ACCESSORIES

Turbo 65C102 Add-on Module	**£115**
Econet Module for the Master	**£45**
Twin ROM Cartridge for Master	**£9**
Quad ROM Cartridge for Master	**£14**
Master Reference Manual I	(No VAT) **£14**
Master Reference Manual II	(No VAT) **£14**
Master Advance Ref Manual	(No VAT) **£17**
64K Upgrade Kit for B+	**£32**
Acorn 1772 DFS Kit complete	**£49**
ECONET Upgrade Kit for BBC B	**£42**
ALL ECONET UPGRADES Available	
ARIES' IEEE Interface for BBC B & Master	**£238**
Morley Teletext Adaptor with ATS Rom	**£99**
Ecolink	**£270**

Z88 Portable Micro

£185

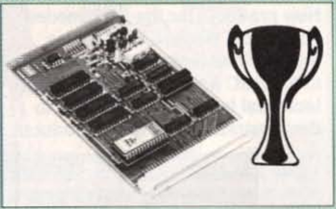
FREE

With every Z88 purchased from us, we are giving away absolutely FREE, a Z88 to BBC Interface Link, 4 rechargeable batteries and a compact Mains Battery Charger worth £38.

Z88 ACCESSORIES

• 32K RAM Pack or 32K EPROM Pack			**£18.00**
• 128K RAM Pack or 128K EPROM Pack			**£42**
• 512K RAM Pack			**£175**
• Z88 Eprom Eraser Unit			**£33**
• Z88 Spellmaster for Pipedream			**£40**
• Z88 Carrying Case			**£8**
• Z88 Computing Book			**£9.95**
• AA Nicad Rechargeable Battery			**£1.50**
• Battery Charger Compact & Fast			**£6**
• Z88 Serial Printer Cable			**£8**
• Z88 Parallel Printer Cable			**£25**
• Z88 to Archi Link			**£15**
• Z88 to BBC Link	**£20**	• Z BASE	**£56**
• Z88 to PC Link II	**£30**	• Z TAPE	**£42**
• Z88 to Macintosh	**£52**	• Z TERM	**£42**
• Z88 Mains Adaptor	**£9**	• Z88 Modem	**£149**

Archi Real-Time Digitiser



Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £175

A Set of Colour Filters for colour image grabbing using a video camera	**£16**
New Risc-OS Software Upgrade	**£39**

Archi Graphic Tablet

The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£15**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Disc Plonker Rack

When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: **£2**

Acorn & Watford DFSs

• Watford sophisticated DFS ROM	**£16.00**
• Watford DFS Kit complete	**£69.00**
• We will exchange your existing ROM for Watford's ultimate DFS ROM at only	**£12.00**
• DFS Manual (comprehensive)	**£6.95**
• Acorn DNFS ROM	**£17.00**
• Acorn ADFS ROM only	**£25.00**
• Acorn 1772 DFS ROM Kit	**£49.00**

(The single Density DFS system is now old technology: Like Acorn, Watford too have decided to replace it with the their more up-to-date 1770 DDFS interface. We have informed most of the software houses of this decision in order that they can ensure compatibility with our highly sophisticated and fully Acorn compatible DDFS).

Watford's MkII 1772

Single/Double Density DFS

Many of our customers have wanted to use our superior DDFS and Acorn ADFS together. Now our Mk II DDFS Board with its 1770 Disc Controller, has been adapted to allow the use of Acorn ADFS as well. It also has all the commands of the Acorn's 1770 DFS, plus the added features.

Added features include:

- Acorn ADFS compatible – Use ADFS on our DDFS board.
- Tube host Code – No longer any need to have the DNFS in your machine to use Co-Processors, even the CoPro and Master 512.
- Auto 40-80 Track sensing – no need to fuss with 40/80 track switches (even works with protected disks).
- An extremely powerful 8271 emulation – ensuring compatibility with almost all software.
- New low profile – small footprint board.
- Fits with all third party ROM boards.
- Option to double the speed of file handling operations – BPUT and BGET.
- Operates in both single and double density modes.
- OSGBPB has been recoded, increasing still further the speed of file handling.

Please note that not all DDFS's are capable of providing either the full 80% storage increase or of allowing a file the full size of the disk – Ours allows both of these!

If you already have a DDFS (any manufacturer), and wish to upgrade to our MkII version, then simply return your existing ROM and DDFS board and we will supply the new DDFS for only **£39.00.**

• SPECIAL PRICE	**£44.00**
• DDFS Manual	(No VAT) **£6.95**
• We will exchange your existing DFS Kit for our sophisticated DDFS for only	**£30.00**

Please note, as the MkII DDFS is a hardware and sofware upgrade, it is not possible for existing Watford DDFS users to simply exchange the ROM for the new version.

3M – Diskettes

3M – SCOTCH Diskettes with Lifetime warranty from Watford Electonics your 3M Appointed Distributor

• *10 x 5.25" S/S D/D 40T (744)*	***£5***
• *10 x 5.25" D/S D/D 40T (745)*	***£5***
• *10 x 5.25" S/S D/D 80 Track (746)*	***£7***
• *10 x 5.25" D/S D/D 80 Track (747)*	***£7***
• *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT*	***£9***
• *10 x 3.5" S/S D/D 40/80 Track*	***£7***
• *10 x 3.5" D/S D/D 40/80 Track*	***£7***
• *10 x 3.5" Double Sided High Density*	***£13***

Top Quality 3.5" & 5.25" Diskettes

To complement our range of Quality Discs and Disc Drives. WE are now supplying SPECIAL OFFER packs of 10 Lifetime guaranteed discs. Each disc has a reinforced hub ring. Supplied complete with selfstick labels and a Plastic Library Disc Box.

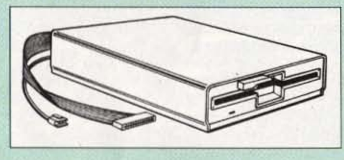
● *10 x **M3** 3.5" D/S D/D 80 Track*	***£7***
● *10 x **M9** 3.5" D/S High Density*	***£12***
● *10 x **M4** 5.25" S/S D/D 40 Track*	***£5***
● *10 x **M5** 5.25" D/S D/D 40 Track*	***£5***
● *10 x **M7** 5.25" D/S D/D 80 Track*	***£7***
● *10 x **M8** 5.25" D/S H/D Hi-Density*	***£9***
● ***M2** 3" Double Sided*	***£2.50 each***

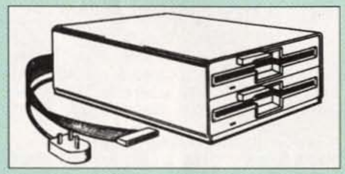
CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Quality Disc Drives from Watford

All our Disc Drives are Double Sided and will operate in both Single and Double Density modes. All 5.25" Disc Drives are 40/80 track switchable. For ease of use, the switches are front mounted.
Various UK "manufacturers" of disc drives for the BBC Micro (more accurately, "packagers" label other manufacturers drives with their own name). We buy the high quality NEC and Mitsubishi drives in large quantities directly from the manufacturers, package them and sell them at "dealer" prices direct to the public.
If you look around the popular BBC Micro press, you will find that the prices we quote for the top quality, new slimline disc drives are, virtually without exception, the best around. These prices, coupled with the backup of one of the country's largest distributors of BBC peripherals provides a superb deal.
Unless you anticipate using dual drives in a fully expanded BBC system for long periods of time with little ventilation, then we suggest that our range of "CL" disc drives without the PSU (Power Supply Unit) would be quite adequate (extensive tests within our workshops have confirmed this). All drives are supplied complete with a SPECIAL UTILITIES Disc, Cables and Plugs. The Drives with power supply have a mains moulded plug for safety purposes. **Ideal for Schools & Colleges.**
When using a BBC Micro, most people find themselves short of desk space. The Watford's BBC Micro plinths form an ideal way of recovering some of this precious space. Your BBC Disc Drive and Monitor can all occupy the same vertical footprint and still be comfortably situated. With the Watford Double Plinth, your Disc Drive is mounted vertically at one side, leaving a very valuable area directly in front of you for such useful items as spare discs, pen, paper, reference manuals, etc. Follow the trend with a Watford plinth. (Turn to the 6th page of our advert for the Plinths).
P.S. All our 5.25" Disc Drives with PSU are compatible with the Compact Micro. All you require is our special Compact Disc Drive cables designed by us.

"Test Bureau Approved for Use in Education"





Our Disc Drives conform to BS415

Type	Description	
	Disc Drive without PSU	
• **CLS400S:**	Single, 40/80 track 400K Double sided Drive	£72
• **CLD800S:**	Twin, 40/80 track, 800K Double sided Drives	£142
	Disc Drive with PSU	
• **CS400S:**	Single, 40/80 track, 400K Double sided Drive	£82
• **CD800S:**	Twin, 40/80 track, 800K Double sided Drives	£155

Special Cable to connect both 3.5" and 5.25" Disc Drives simultaneously to the BBC Compact £13

Disc Drive/DDFS Offer

- The popular CLS400S 40/80 track switchable disc drive.
- Watford's popular Mk II DDFS Interface (allows up to 720K storage). Will run both in single & double density modes.
- A comprehensive DFS Operating manual

Bargain at Only **£116** (Offer valid until stocks last)

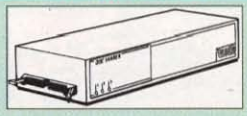
3.5" DISC DRIVE

These top quality 3.5" Double sided, 80 track, are attractively finished in BBC beige. They are supplied complete with all cables and a Utilities Disc.

Type	Description	
	Disc Drive without PSU	
• **CLS35:**	Single Disc Drive, 400K	£62
• **CLD400S:**	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
• **CS35:**	Single Disc Drive, 400K	£83
• **CD35:**	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

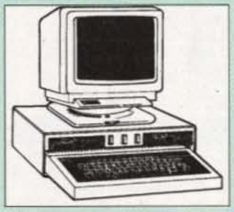
Disc Drive Sharer



(Ideal for educational establishments)
A low cost alternative to the Econet system. Watford's Intelligent Disc Drive Sharer allows you to connect 3 BBC Micros (model B, B+ and Master series) to a single or double disc drive. Running under any DFS or DDFS, this intelligent unit will automatically queue the computers. Each computer has a status light dedicated to it. If it is green you will get immediate access to the disk, and red means that you are next in line. The unit plugs directly into the disc drive socket on each computer and is powered by the mains. (N.B. Not for use with ADFS.)

Price includes 3 Cables £55

Disc Drives in Monitor Stand



• **CDPM 800S** – Twin 5.25", 800K Double sided 40-80 track switchable disc drives mounted in an attractively finished Beige colour plinth for the BBC B & Master 128K micros. Supplied complete with integral power supply, cables and Utilities disc. The mains switch with neon On/Off light indicator, and the two 40/80 track switches are mounted on the front panel for ease of use.

£165

• **DP35 800** – Same as above except, one disc drive is a 5.25" and the other is 3.5".

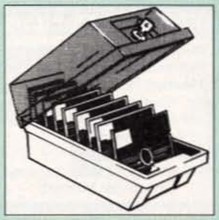
£154

Floppy Head Cleaner Kit

The heads in floppy drives are precision made and very sensitive to dirt. The use of Cleaner Kit is a sensible precaution against losing valuable data. It is recommended to clean the drive head once a week. it is very simple to use. Available in 3.5" & 5.25", please specify.

Price £4

Antistatic Lockable Disc Storage Units

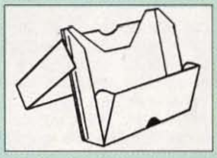


Gives double protection – Strong plastic case that affords real protection to your discs.
Antistatic helps avoid data corruption whilst in storage. The smoked top locks down.
Dividers and adhesive title strips are supplied for efficient filing of discs.

• **M35** – holds up to 50 5.25" discs	£4.95
• **M85** – holds up to 95 5.25" discs	£6.95
• **M25*** – holds up to 25 3.5" discs	£4.95
• **M50** – holds 50 3.5" discs	£6.50
• **M10** – holds 8 of No. 10 Data Cartridges	**£15**

* Not lockable

Plastic Library Cases



Holds up to 10 x 3.5" Discs.	£1.50
Holds up to 10 x 5.25" Discs.	£2.00

Dust Covers (For our Disc Drives)

Single CLS (without PSU)	£3.20
Single CS (with PSU)	£3.25
Twin CLD (without PSU)	£3.85
Twin CD (with PSU)	£3.90

Disc Albums

Attractively finished in black leather-look vinyl. Stores up to 20 discs. Each disc can be seen through the clear view pocket.

£4

Special Bulk Offer on Discs

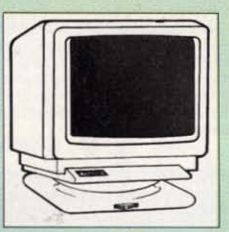
(Supplied packed in Anti-Static Lockable Storage Units)
(Lifetime warranty on Discs)

PRICES SLASHED

BULK PACK DISCS in lots of 100

Type	S/S 40T	D/S 40T	D/S 80T
• Without Sleeves 5.25"	£30	£35	£40
• With Sleeves 5.25"	£33	£38	£43
• 3.5" D/S D/D	£29 for 50		£52 for 100

Continued→ → → → → → → → →



Microvitec Monitors

• **1431** – Standard Resolution Monitor	£169
• **1451** – Medium Resolution Monitor	£209
• **Cub3000** Medium Res for A3000	£189
• **1441** – High Resolution Monitor	£359
• **2040 CS** 20" Hi Res	£675
• Dust Cover for Microvitecs	£5.50
• **Touchtec 501 Touch Screen**	£239

Now 3 years Parts & Labour warranty on all Microvitec Monitors

Multiscan Colour

• Eizo 9060S	£389	• NEC 5D	£1179
• Eizo 9070S	£579	• Taxan 770LR	£370
• NEC 2A	£245	• Taxan 775	£369
• NEC 3D	£323	• Taxan 795	£405
• NEC 4D	£629	• Taxan 875	£669
• VIDC Enhancer Board			£25

(P.S. Taxan 795 monitor is supplied with a FREE VIDC enhancer board)

NEW

Aries AlphaScan Monitor

Pound for Pound, the AlphaScan VGA Multiscan monitor provides the maximum performance and greatest flexlbility of any 14" colour monitor for the Archimedes micro.

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied (free) with the monitor allows high resolution operation in all screen modes.

£325

Philips Monitors

• **BM7502** 12" Hi-res Green Monitor	£67
• **BM7522** 12" Hi-res Amber Monitor	£67
• **CM8833** 14" Med. Res Colour Monitor	£170
• TV Tuner for CM8833 Monitors	£62
Dust Cover for Philips Monitors	£6

FREE Swivel Base with Philips CM8833!

STAR BUY

- **PHILIPS 14"** Medium Res, dark glass, attractively finished Colour Monitor. A push-button switch toggles between Hi-Res monochrome green text mode and full colour display. (Please state the type of Connecting Lead you require).

ONLY £167

Refurbished Monitors

Philips 14" Refurbished Colour Monitors, same specification as the 'Star Buy' Monitors above £119

(Offer valid while stocks last)

Spare Monitor Leads

BNC Lead for Zenith or Philips	£3
Skart Monitor Lead	£5
RGB lead for TAXAN Monitors	£3
Archimedes Colour Monitor Lead	£7.50

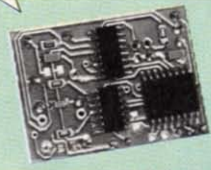
Anti Glare VDU Screen

These extremely effective, easy to install, 12" & 14" VDU screens eliminate harmful glare, improves contrast on colour monitors. Increases productivity in offices. A must for wordprocessor users.

£12

NEW

Watford VIDC Enhancer



This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A WIMP application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

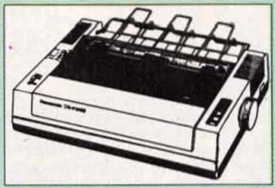
Super VGA VIDC Card: This provides support for both VGA and Multisync monitors. A unique electronic design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control

£45

MultiVideo VIDC Card: As above but for MultiScan monitors only.

£25

Panasonic Printers



• **KX-P1081**	£105	• **KX-P1180**	£99
• **KX-P1123**	£144	• **KX-P1624**	£285
• **KX-P1124i**	£194	• **KX-P1654**	£399
• **KX-P1170**	£125	• **KX-P1695**	£285

Panasonic Accessories

Cut Sheet Feeders

KX-P1592/1595 (P32)	£175	KX-P1540 (P35)	£175
KX-1124 (P36)	£79	KX-P1180 (P37)	£66
KX-P1624/1695 (P38)	£124	KX-P1123 (P37)	£66

Buffers

P12 4K buffer Board for 1081	£55
P42 32K buffer Chip for 1592/1595	£16
P43 32K Buffer Chip for 1123/24/80	£16

Serial Interfaces

P17 P1081/1592	£32	**P19** P1124/1180	£49

Citizen Printers

120D Plus	£96	124D Printer	£139
Prodot 9	£196	Prodot 24	£219
Prodot 9X	£245	Swift 24	£205
Swift 9	£129	Swift 24X	£264
• Prodot Cut Sheet Feeder			£120
• Swift 24 Colour Option			£29
• Swift 24 Ribbons	Black **£4**		Colour **£13**
• Swift 24X Cut Sheet Feeder			£125
• Prodot 24 Cut Sheet Feeder			£124

Integrex Colour Jet

• Colour Jet 132 Printer	£499
• Paper Roll	£6.50
• BBC Screen Dump Software	£10
• Colour Cartridge	£21
• Black Cartridge	£12.40
• 100 A4 OHP transparencies	£55
• 8K Serial Interface Optional	£123

Star Printers

• **LC10** 9pin 80col. 144/36 CPS	£105
• **LC15** 9pin 136col. 180/45 CPS	£173
• **LC24-10** 24pin 80col. 180/60 CPS	£143
• **LC24-15** 24pin 136col. 200/67 CPS	£288
• **FR10** 9pin 300/76 CPS 31K 16 fonts	£210
• **FR15** Wide carriage version of above	£260
• **XB24-10** 24pin 80col. 240/80 CPS	£269
• **XB24-15** 24pin 80col. 240/80 CPS	£345
• **XB24-200** Colour 24pin 136col 300/100cps	£309
• **XB24-250** Colour 24pin 136col 300/100cps	£379
• **XB-24** Colour Kit	£29
• **LC-200** Colour 9pin 80col. 180/45 CPS	£152
• **LC-24-200** 24pin 80col. 222/67 CPS	£180
• **LC24-200** Colour 24pin 80col. 222/67 CPS	£217
• **SJ-48** StarJet 360dpi	£209
• **ZA-200** Colour 9pin 80/136col 420/84cps	£319

Star Accessories

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139

Serial Interfaces

SPC-10	LC10; LC10-II; LC10-Col; LC15; LC24-10; LC24-15; LC-200; LC24-200	£49
8K Ser	LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15	£64

Paper Roll Holders

LC-200; LC24-200; LC24-200 colour	£29

Buffers

32K Ram Card for LC/XB24-10; 15; LC200	£55

Ribbons

LC10; LC10-II; LC15	Black **£4;**	Colour **£6**
LC-200; LC24-200	Black **£5;**	Colour **£12**
XB24-10; XB24-15	Black **£5;**	Colour **£12**

Laser Printers

All Laser Printers include 12 months On-site maintenance

• Canon LBP-4	4ppm	£580
• Canon LBP-8 III	8ppm	£975
• Canon LBP-8 IIIR	8ppm	£1499
• Canon LBP-8 IIIT	8ppm	£1365
• Epson EPL7100	6ppm	£619
• HP Laserjet III	8ppm	£1019
• HP Laserjet IIID	8ppm	£1695
• HP Laserjet IIIP	4ppm	£689
• HP Laserjet IIIsi	16ppm	£2475
• Panasonic KX-P4420	8ppm*	£629
• Panasonic KX-P4450i*	11ppm*	£1015
• Panasonic KX-4455 Postscript	11ppm*	£1469
• Star LP-8 II	8ppm	£929
• Star LP-8 Star(post)script	8ppm	£1129
• Star LP-4	4ppm	£689
• Star LP-4PS Postscript	4ppm	£799

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£47	KX-P4420/50	£19
Epson GQ	£13	Laserjet III to III/P	£55
EPL7100	£82	Laserjet II/D, III/D	£48
Star LP-8	£69	Qume Crystal	£42

Laser RAM Upgrades

• IIP & III 1MB	£65	• EPL7000 2M	£365
• IIP & III 2MB	£97	• GQ5000 512K	£75
• II & IID 1MB	£64	• KX4420/50 1M	£89
• II & IID 2MB	£100	• KX4420/50 2M	£125
• II & IID 4MB	£155	• KX4420/50 4M	£215
• Canon LBP4 1M	£129	• Star LP8 1M	£139
• Canon LBP8 2M	£125	• Star LP8 2M	£275

Laser Drum & Developer

• Epson Drum	GQ5000	£93	EPL7100	£129
• Panasonic 4420 Drum		£60	Developer	£59
• Panasonic 4450 Drum		£93	Developer	£80
• Qume Drum		£76	Developer	£56

Jetpage Postscript Cartridge

• HP IIP/III	£239	IID & IIID	£240

Various Add-Ons

Laserjet Appletalk Interface	£139
HP Adobe Postscript	£290
Pacific Page Postscript	£259
HP Premier Font Collection	£28
Jetfont Superset	£145

Hewlett-Packard Printers

• # Desk Jet 500	**£285**	• Paintjet XL	**£999**
• Desk Writer (Mac)	**£480**	• Quiet Jet Plus	**£350**
• Desk Jet Cartridge	**£15**	• HP Think Jet	**£232**
• Paint Jet Colour	**£569**	• Rugged Writer	**£825**

Now 3 years extended Parts & Labour warranty

• Paintjet Cartridges Black **£19;** Colour	**£25**
• Desk Jet 500 256K RAM cartridge	**£129**
• HP Epson FX Emulation Cartridge for Desk Jet	**£59**

HP Apple Talk Interfaces for

• Scan Jet	**£299**	• Paint Jet	**£POA**
• Desk Jet Unlimited (Book No VAT)			**£19.75**

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10E	£178	£43		£16
BJ300	£320	£88	£65	£12
BJ330	£374	£110	£79	£12

• Spare Battery pack for BJ10E **£33**

NEC Pinwriter Printers

• P20	**£179**	• P70	**£448**
• P30	**£237**	• P90	**£646**
• P60	**£345**		

Epson Printers

DFX5000	**£1059**	LQ860 Colour	**£459**
DFX8000	**£1985**	LQ1050+	**£459**
EX1000 Colour	**£428**	LQ1060 Colour	**£609**
FX850	**£272**	LQ2550+	**£685**
FX1050	**£346**	LX400	**£105**
FX1060	**£595**	LX850	**£146**
LQ400	**£156**	SQ850	**£425**
LQ550	**£204**	SQ2550	**£628**
LQ850+	**£377**		

Cut Sheet Feeders for

LX400/800/850/LQ400/500/550			**£69**
EX800/FX800/850/LQ800/850			**£130**
FX/LQ 1000/1050/SQ850			**£159**
LQ 2550	**£390**	SQ2550	**£390**

Tractor Feed for

LQ800 **£44;** LQ850/FX850 **£69;** LQ1050/FX1050 **£85;** LQ2500 **£90;** LQ2550 **£90.**

Accessories

• EX800/1000 Colour Option	**£45**
• EX800/1000 Colour Ribbon	**£14**
• LQ2500 Colour Option	**£65**
• Multifont Card for LQ550/850/1050	**£95**

Epson Printer Interfaces

All these interfaces fit inside the printer

RS232	**£32**	RS232 + 2K Buffer	**£52**
IEEE 488	**£95**	RS232 + 8K Buffer	**£75**

Printer Leads

BBC Centronics 4' long	**£5**
BBC Centronics 6' extra long	**£7**
Compact's Special Centronics Lead	**£7**
Nimbus Centronics Lead	**£6**
IBM/Archimedes Parallel Lead 6'	**£4**
IBM/Archimedes Parallel Lead 5 metres	**£10**
IBM/Archimedes Parallel Lead 10 metres	**£15**
Double Ended 36 way Centronics Lead 4'	**£7**
Double Ended 36 way Centronics Lead 6'	**£9**
MSX Centronics Parallel Lead 4'	**£12**
RS232 Leads (Various)	**P.O.A.**
IBM Keyboard extension lead coiled	**£5**

Concept Keyboards

Standard A3 Keyboard with BBC Software	**£143**
Standard A4 Keyboard with BBC Software	**£117**
Archi A3 Keyboard	**£144**
Archi A4 Keyboard	**£118**

CREDIT CARD 24 HOUR
Ansaphone Hot Lines
(0923) 50234 or 33383

Plotters

• HP7440	**£415**	• HP7475	**£599**

Roland Plotters

• DXY1100	**£499**	• DXY1200	**£629**
• DXY1300	**£830**	• DXY2500	**£2375**
• DPX3500	**£3289**	• Sketchmate	**£315**
• Roland plotter Pens, Fibre tip			**£7.50**

Listing Paper (Perforated)

• 1,000 Sheets 9.5" x 11" Fanfold Paper	**£7**
• 2,000 Sheets 9.5" x 11" Fanfold Paper	**£11**
• 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold	**£21**
• 1,000 Sheets 15" x 11" Fanfold Paper	**£9**
• 2,000 Sheets 15" x 11" Fanfold Paper	**£16**
• 1,000 Sheets true A4 Fanfold Paper 70gms	**£11**
• 2,000 Sheets true A4 Fanfold Paper 70gms	**£21**
• Teleprinter Roll (Econo paper)	**£4**

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 90 x 36mm (Single Row)	**£6.00**
1,000 90 x 36mm (Twin Row)	**£6.25**
1,000 90 x 49mm (Twin Row)	**£7.50**
1,000 102 x 36mm (Twin Row)	**£6.75**

Laser Printer Labels on A4 Sheets

3750 70 x 29mm (3 Rows)	**£13.50**
3000 70 x 37mm (3 Rows)	**£13.25**
2625 70 x 42mm (3 Rows)	**£13.00**

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
Brother HR15/20	**£6.00**	**–**
BBC Micro	**–**	**£3.50**
BBC Master	**–**	**£4.00**
Archimedes Micro pair	**–**	**£9.00**
Citizen 120D	**£2.75**	**£4.50**
DMP2000	**£2.75**	**£4.75**
DMP4000	**£3.75**	**£4.85**
EX800/1000	**£3.50**	**£5.00**
RX/FX80/85/800/MX80	**£2.95**	**–**
FX/MX/RX100/1000	**£3.95**	**–**
Kaga/Taxan KP810/815	**£3.25**	**£5.00**
LQ400/500/550/800/850	**£3.25**	**£6.00**
LQ1050/LQ2500	**£4.00**	**–**
LX80/86/800/850	**£2.75**	**£4.50**
LX400	**£3.50**	**£5.00**
M1009/GLP	**£2.95**	**£3.75**
NEC P2200	**£4.50**	**£5.00**
Panasonic KX1080/81	**£3.25**	**£4.75**
Panasonic KX-P1124	**£7.50**	**£5.00**
SQ2500	**£8.00**	**£5.50**
Star LC10/NL10	**£2.75**	**£5.00**
Star LC24-10	**£2.95**	**£6.00**
Olivetti Ink Jet Cartridges (set of 4)	**£6**	

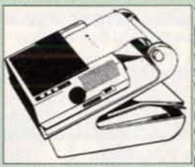
Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110	for KX-P1081, 1592 & 1595				**£6**
P115	for KX-P1180	**£7**	**P145**	for KX-P1124	**£7**
P140	for KX-P1540	**£8**	**P155**	for KX-P1624	**£8**

Colour Ribbons for KX-P1081, 1592 & 1595
Brown, Blue or Red **£9 each**

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 Printers to 1 Micro with our combined, Sharer/Changer. These Units are made to a very high standard. For extreme reliability, they all have Printed Circuit Boards mounted inside the case, (not a Spaghetti Junction of wires).

(Ideal for School environments)

Connects	Serial	Centronics
2 to 1	£16	£17
3 to 1	£22	£24
5 to 1	£32	£36

(Cables extra at £6 each. Please specify type required when ordering)

2 Way Compact Printer Switch

A handy 2 way printer switch. Enables one micro to be connected to 2 printers or vice versa.
Centronics **£18;** Serial **£17**
(Cables extra at £6 each)

Auto Printer Sharer Switch

Connects	Serial	Centronics
2 to 1	£40	£45
4 to 1	£62	£59
8 to 1	–	£89

256k Multi Spooler

These Auto Centronics Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

• 2 In/2 out	**£135**	• 4 In/2 out	**£169**
• 8 In/1 out	**£199**		

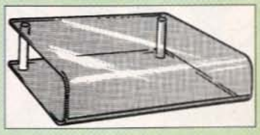
Compact Converter Units

Serial to Parallel	**£36**	Parallel to Serial	**£37**

Laser Direct

• Laser Direct Qume 6ppm complete	**£825**
• Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers	**£325**
• LPB 4 Printer plus High Res Card	**£899**
• LPB 8III Printer plus High Res Card	**£1299**

Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version	**£16** (carr £3)
136 Column version	**£20** (carr £4)

All prices are exclusive of VAT

Continued→ → → → → → → → →

QUEST MOUSE Mk III

• Quest Mouse III & Quest Paint	£59
• Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont	£89
• Quest Mouse III only	£30
• Quest Paint Software only	£34
• Quest Font Disc (22 Text Fonts)	£15
• Quest Mouse Mat (Red or Blue or Green please specify)	£3
• Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer	£18

(P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

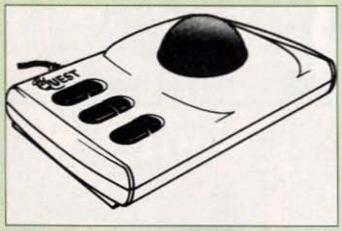
ConQuest ROM Package £30
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)

ARCHI Mk II MOUSE

An extremely reliable replacement mouse for Archimedes Micro £32

Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10	BBC/Master Version	**£27**
QT-20	Archimedes Version	**£30**

RB2 Marconi TRACKER BALL

RB2 (AMX/Quest compatible)	£45
RB2 including Quest Paint	£75
RB2-A for Archimedes	£46

THE NEW Mk III AMX MOUSE

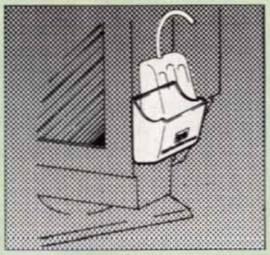
Inc. Super Art package

ONLY: £59 (carr £3)

(Please specify for BBC, Master or Compact)

MOUSE MAT	£3
AMX MOUSE ONLY	£29
AMX SUPERART Package	£34
AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse	£32
PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker	£13
AMX DESIGN (ROM)	£55
AMX XAM Educational	£15
AMX EXTRA EXTRA	£16
AMX MAX A gem of desktop (ROM)	£20

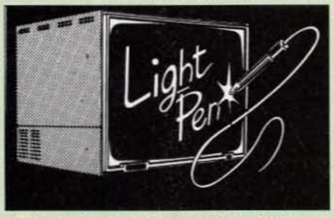
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive or desk.

It protects it from damage when not in use, yet within easy reach when you need it again. At £4 it does not cost a rodent's ransom.

Price £4



Our Mark II Light Pen is the very latest in light pen technology. It is totally insensitive to local lighting conditions and works with many different monitors. The pen only responds to the High Frequency light produced by your monitor/TV. An LED indicates when valid video data is being produced. A conveniently located switch is also fitted. (Price includes FREE software Disc and Operating Manual)

Only £21

FLEET STREET EDITOR

Software pack for BBC Micro	£33
Software pack for the Master	£39
Admin Xtra Disc Utility	£13
Fonts N Graphics Disc Utility	£13

BEEB VIDEO DIGITISER

"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro. This uses the full graphics capacity of the BBC micro in modes 0, 1 or 2. The video source may be a camera, video recorder or television, and is connected via the video output socket. The software supplied includes a sophisticated, fast screen dump routine.

Images produced can be compressed, stored to disc, printed on an Epson compatible printer, directly used to generate graphics, analysed for scientific and educational use or converted to other formats e.g. Slow Scan TV or receiving a picture from a remote camera using a modem. The output from the digitiser exactly matches the graphics capability in each mode, with up to 8 levels of grey in mode 2. The unit connects into the User Port and automatically scans a complete picture in 1.6 seconds.

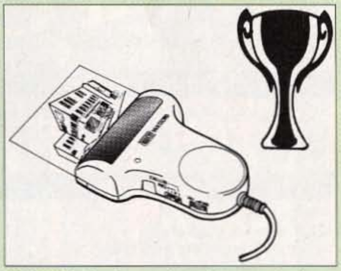
£109 (Carr. £5)

(BBC B+ and Master compatible, except Master with Econet)

(Price includes) Digitiser Unit, Software in ROM & a Comprehensive Manual)

The Beeb HandScan

Hand-held Scanner for the BBC Micro



Watford Electronics are pleased to announce the launch of the first hand held scanner for the BBC Micro. HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs! These useful devices have been available for faster and more expensive micros for some time, but only now is Watford Electronics able to offer the BBC Micro computer.

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware £135

WAPPING EDITOR
"MIGHTIER THAN THE QUILL"

Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£59**
Wapping Editor plus Mouse	**£79**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages layed out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are three Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.
The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

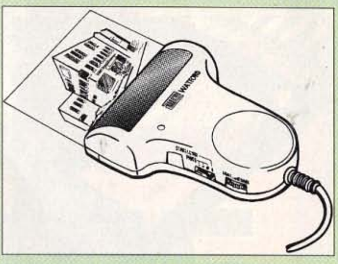
Archi A4 Scanner	£349
Sheet Feeder for above	£95
Scanner + Sheet Feeder	£419

(Dealers Inquiry welcome)

Computer Concept Scanlight

• Scan-Light A4	£375
• Scan-Light A$ + Sheet Feeder	£475
• Scan-Light Junior mono	£178
• Scan-Light Junior 256	£215

Archi Mk II Hand Scanner



Watford Electronics is now able to offer a complete hand held scanning package, possibly the most essential addition to any desk top publishing system, for only £149. The package includes the most comprehensive utility software available for the Archimedes, a high quality hand held scanner, and all necessary documentation to get you going straight away.

SCANNER

The scanner is capable of scanning up to an amazing 400 dots per inch (DPI)! The scanning area is 4" wide, and the height is only limited by the maximum amount of memory available. The dot resolution may be switched to 100, 200, 300 or the maximum 400 dpi. One of four operating modes may be selected offering either pure monochrome scanning, or one of three grey level modes. The grey level modes use different size dither patterns to represent up to 16 shades of grey. There is also a dial to allow the "brightness" to be adjusted over a wide range, in order to optimise the quality for any specific image. The scanner interface is a standard, single width, expansion card (podule) which plugs into the Archimedes' backplane. The socket on the rear panel connects the scanner by 1.8 metres of cable.

SCANNER SOFTWARE

Full use is made of the windowing and the multi-tasking facilities of RiscOS. The software is supplied in a 64Kbyte ROM located on the interface board. The scanner appears as a small icon on the desktop icon bar, and the software is retrieved from the ROM simply by clicking on that icon. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. The other facilities included in the software are.

Cropping and scaling to any size including stretching and squashing in X and Y direction separately.

Colour tinting.
X and Y flip.

Edge detection which turns solid objects into outlines.

Selective directional copying which allows features (i.e. lines or text) to be made thicker or thinner.

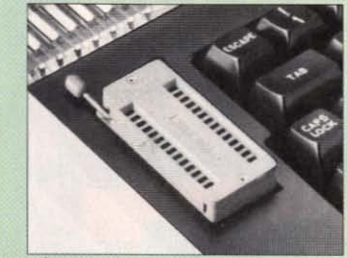
Scanned images may be saved as sprite files or transferred directly into other RiscOS applications (DTP, Draw, Paint) simply by dragging the sprite file into the application's window. Sprites may also be generated using anti-aliasing. This greatly improves picture quality and is particularly effective when scanning material with a range of grey tones, such as photographs. Images can be printed on any printer that is supported by a RiscOS printer driver, with optional settings for portrait or landscape modes, image scale and positioning. Images are printed using the full resolution of the printer and are not limited to the screen resolution.

On-screen help is provided via the RiscOS interactive help facility. Calls are also provided in the ROM for users wishing to write their own software, incorporating the use of the scanner.

AHS-4 Archi 300/400 Version	**£149**
AHS-3 Archi A3000 Version	**£175**

Continued→ → → → → → → → →

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without opening the lid. The ZERO INSERTION FORCE (ZIF) socket is located into the ROM Cartridge's position.

- Very simple to install. NO SOLDERING required. The ZIF (Zero Insertion Force) eliminates the possibility of damage to your ROM pins when inserting & extracting.
- The low profile of the socket allows unrestricted access to the Keyboard.
- All data and address lines are correctly terminated to ensure correct operation of suitable ROMs with the BBC micro. We also supply a purpose designed see-through storage container with anti-static lining, allowing you to store up to 12 ROMs, protecting them from mechanical and static damage.
- This versatile hardware solves the problem of running out of socket space. Simply lift the ROM from the ZIF & insert a different one (No pulling or pushing of Cartridges. It is a must for professionals and Hobbyists alike.)
- BBC, B and B+ compatible.

ONLY **£18**

BBC B Low Profile Cartridge System

Complete System consists of: Low profile ROM Cartridge, Socket housing, Cable assembly, 5 labels and a library storage rack for the BBC B.

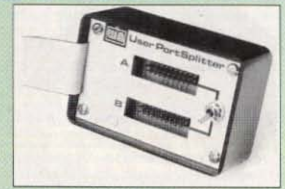
• Complete System	£11
• Spare Cartridges	£2.75
• Spare Rack	£1.65

ROM Cartridges for the BBC Master

Will accept the new larger Piggy Back ROMs like: Interword, Interbase, Quest, Conquest, etc

Twin **£8;** Quad **£13**

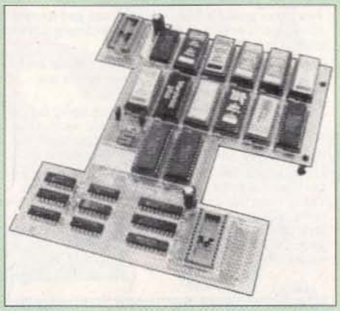
User Port Splitter Unit



Gone are the days when you had to plug and unplug devices from the User Port. This extremely useful little device allows two units to be connected to the User Port simultaneously, and select between them simply by toggling a switch. This device is particularly useful for those people using Quest Mouse and the Watford Video Digitiser or any similar combination

Excellent Value at **£22**

Solderless Sideways ROM Socket Board



The key features of this new, no fuss, easy to install quality product from BBC leaders Watford Electronics are as follows:

- Increase your BBCs capacity for ROMs from 4 to 16.
- **No soldering required.**
- Very low power consumption.
- Minimal space required.
- Compatible with Torch, DDFS, RAM Card, 2nd Processor, etc.
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish") allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £35

Battery Backup fitted **£39**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

NEW

Commander Joystick

Watford Electronics' new Commander Joystick for the BBC B and Master 128K has a unique dual mode of operation giving selective free floating or self centring fully variable control in both X and Y axis directions. Commander is particularly good for flight simulation and drawing programs.

Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

Launch Price: £15

ARIES CORNER

B-32 Shadow RAM Card

Like the BBC B+, the B32 provides 20k of shadow screen RAM and 12k of sideways RAM. Unlike the B+, the B32 has simple software commands which allow the user to reconfigure the RAM as 16k of shadow RAM and 16k of sideways RAM, or all 32k as sideways RAM.

With the B32, the programmer gets up to 28k of RAM available for Basic, Logo, Cobal, Forth, Lisp and BCPL programs in any screen mode. The business user gets extra memory for View, ViewSheet, Wordwise Plus, Interword and many other applications. For advanced applications, the scientific user gets access to a massive 47k of data storage using the Acorn approved ★FX call.

Sideways RAM enables you to load sideways ROM images from disc, allowing you to have a large library of sideways ROMs (subject to the copyright holder's permission) stored on disc. The B32's sideways RAM can also be used to extend any operating system buffer (such as the printer buffer) or to load tape programs into a disc system.

The B32 simply plugs into the 6502 processor socket on you BBC micro – no flying leads to connect and no soldering. Provision of the onboard ROM socket means that the Aries-B32 control ROM does not use up one of your existing ROM sockets.

- Recommended by Computer Concepts for use with their Inter series of ROMs.

Price: **£59**

Aries B-12 Sideways ROM Board

The B-12 provides a total of twelve sideways ROM sockets (the four in the original machine are replaced by the twelve on the board), all fully accessible by the MOS sideways ROM system. In addition, there are two sockets for sideways RAM, giving up to 16k of RAM using 6264 static RAM chips.

If you do not have a B32 or B20, a small adaptor module (the Aries-B12C) is available at a nominal cost

Price:	Aries B-12	**£36**
	Aries B-12C	**£5**

Aries B-488 IEEE-488 Interface Unit

The Aries-B488 is an interface unit to enable the BBC micro to control and monitor IEEE-488 bus systems. The IEEE-488 bus (also known as the 'GPIB or 'HP IB') is the standard method of interconnecting programmable laboratory instruments and control equipment. Using the B488, up to 15 devices may be connected in a single high-speed data network.

£238

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 3C Joystick for Compact	£10
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24

Delta Base B

Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128 **£25**

ROM/RAM Card

Watford Electronics announced the first ever commercial ROM board for the BBC micro, the Watford Electronics 13 ROM Socket Board 7 years ago. Following the success of this board, we have designed what probably represents the ultimate in expansion boards, the new Watford Electronics ROM/RAM board. This highly versatile and sophisticated board represents the latest in "2nd generation" sideways ROM technology for the BBC micro, designed to satisfy the serious BBC user.

- NO SOLDERING required to fit the board.
- NO User Port corruption (avoids problems with the mouse, modems, Eprom Programmers, etc.)
- Fully buffered for peace of mind.
- Compatible with BBC micros (not BBC+ or Master).
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).
- Option for 16k of battery backed CMOS RAM (CMOS RAM needs one ROM socket).
- Software Write protect for ALL RAM.
- Read protect for CMOS RAM (ALLEVIATES crashes during ROM development).
- Separate RAM write register (&FF30 to &FF3F).
- Automatic write to currently selected RAM socket for convenience.
- FREE utilities disc packed with software.
- Compatible with our DDFS board, 32k RAM Card, Delta Card, sideways ZIF, etc.
- Large printer buffer.
- UNIQUE fully implemented RAM FILING SYSTEM (similar to the popular Watford DFS).
- ROM to RAM load and save facilities.

The SFS (Silicon Filing System) can utilise up to the full 128k of RAM (with the SFS in any paged RAM) as a SILICON DISC. This behaves as a disc drive, with all the normal Watford DFS features (including OSWORD &7F for ROMSPELL, etc.) to provide an environment that looks like a disc but loads and saves MUCH faster.

The ROM-RAM Board plugs into the 6502 CPU socket. This leaves free all the existing ROM sockets, which can still be used normally.

Any ROM that can be plugged into the BBC micro's own ROM sockets may be used in the ROM-RAM Board.

The ROM-RAM Board is supplied with all ordered options fitted as standard. Upgrade kits (with full instructions) are available for all of the options, for later.

PRICES:

• ROM/RAM card with 32k dynamic RAM	**£45**
• ROM/RAM card with 64k dynamic RAM	**£59**
• ROM/RAM card with a massive 128k dynamic RAM	**£99**

(carriage on ROM-RAM Card £3)

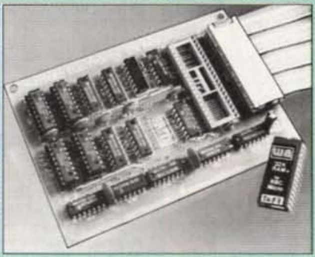
OPTIONAL EXTRAS:

• 16k plug-in Static RAM kit	£9
• 16k Dynamic RAM for Upgrade	£13
• Battery backup	£3
• Read and Write protect switches	£2 each
Complete ROM-RAM board All options installed	£115

P.S.

IS your existing ROM Board overflowing with ROMs? Do you need more Sideways RAM? Is your Board unreliable? Then upgrade to Watford, ROM/RAM Board and pay £5 less.

32K Shadow RAM/Printer Buffer Card Expansion Board



A MUST FOR WORD PROCESSING

Don't throw away your BBC B for a BBC B Plus or BBC Master. Just plug the ribbon cable into the 6502 processor socket, and fit the compact board inside the computer. Immediately you will gain not 16k or even 20k, but a massive 32k of extra RAM!!!

- IMPROVE your WORD PROCESSING system, whether disc or cassette based. Don't wait for a slow printer – type in text while printing. TWO JOBS DONE SIMULTANEOUSLY and £100+ saved on a printer buffer.
- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28,000 bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Combine GOOD GRAPHICS and LONG PROGRAMS. Use the top 20k of the expansion RAM as the screen display memory, leaving all the standard BBC RAM free for programs. Benefit from MODE 0/1/2 graphics and 28k of program space.
- Use the FULL 32k or the bottom 12k of the expansion RAM as a PRINTER buffer for PARALLEL or SERIAL printers, sound channels, RS432 etc. Print large text files while running long graphics programs, and have all your buffer options available as well (*FX15,21,138, 145,ADVAL etc). Please note only a 12k printer buffer can be used with Wordwise or Wordwise-Plus, due to the way they are written.
- Unique facility to turn ROMs off and on again. Unlike all other ROM managers, this feature does not use 'unofficial' memory. Two bytes of normally user-inaccessible memory on the RAM card are used to ensure ROMs are disabled WHERE OTHER ROMS FAIL.

Only £54 (carr £3)

(Price includes a comprehensive manual and the ROM)

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Word-Aid

The most comprehensive utilities ROM for Wordwise-Plus

Extend the power of your Wordwise Plus word processor with this most advanced ROM from Watford. By utilising the powerful Wordwise Plus programming language, WordAid provides a whole host of extra features, all accessed via a special new menu option. This ROM has been personally approved by Mr Charles Moir, the author of WORDWISE PLUS.

- Alphabetical sorting of names and addresses.
- Text transfer options.
- Chapter marker.
- Epson printer codes function key option.
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- Address finder.
- Label printer.
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- BBC B, B+ and Master compatible.

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(N.B. Word Aid requires a Disc interface in your Micro)

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(When ordering please specify for which Micro & 40 or 80 track Disc)

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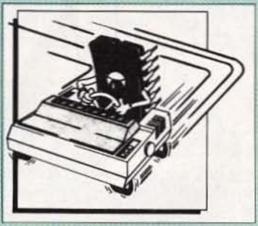
View Printer Driver Discs

Epson FX & RX 80	£10
Juki & Brother HR	£10

View Printer Driver ROM



View is a powerful word processor, but it seriously lacks in terms of printer driver support. With the View Printer Driver ROM, the View users will find themselves in the realms of advanced word processing.

The VPD extends View's printer command with a series of mnemonic commands. All standard highlight sequences are also supported. A large range of printers are supported by drivers contained within the ROM (the drivers can be downloaded and customised). Printers supported include: Epson's MX, RX, FX, LX, JX80 range, HI80, KP810/910, PW1080, JP101, HR15, M1009, GLP, Panasonic KX-P1081/2, JUKI 6100, etc.

Other printers are readily supported by defining a Printer Driver using the built-in Printer Driver Generator. The features mentioned below are available to both the built in Printer Drivers and user defined drivers (assuming the printer supports the features).

NLQ control, Underline, Bold, Proportional Spacing, Microspacing, Italic, Superscript, Subscript, Condensed, Enlarged, Double Strike, Set lines per inch numerically (e.g. LPI 6), Set characters per inch numerically (e.g. CPI 5), Select printer font, Select printer ribbon colour, Translation sequences, Emulation of BBC Character Set, Simple numeric expressions for certain operations, Full printer setup, Send control codes, Print prompt on screen, Redifinable Pad character, Pause for key press, Prompt to change daisywheel, and Execute ★ command when printing.

Other features include a very powerful on-screen preview, with bold, italic, underline, super/subscript, enlarged highlights, and a special printer driver to allow memory-based text to be previewed by View 1.4. Of course, View 1.4, 2.1 and 3.0 are all supported, as is Shadow RAM and 6502 Second Processors. The BBC B series and Master series of micros are supported. A comprehensive manual is supplied. All in all, a very professional product for the discerning user who wants power at their finger tips.

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Office Master

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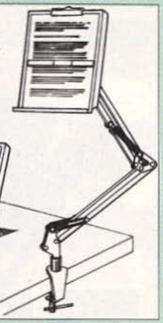

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The Epson RX/FX/KAGA Printer Commands Revealed Handbook

Printer Commands Revealed

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

It describes in detail how to obtain the maximum in graphics capability from your printer and includes full indexes allowing you to cross index the numerous commands. Every command is explained in detail, with an accompanying BBC Basic program and an example of its use from Wordwise.

£5.95 (No VAT)

ALL PRICES EXCLUDE VAT

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Although Acorn machines (such as the BBC B, the Master, the Archimedes and the BBC A3000) are mainly used in education, most commercial computers use other operating systems, particularly MS-DOS. As a result school computer users are at a disadvantage when moving into 'business' computing. PCs and other commercial computers use MS-DOS as the operating system, so commands for formatting, copying, backing up, printing and the modem are not the same. Even file names are written differently! And did you know that there is one Acorn command which, if used in MS-DOS, wipes everything in the current directory?

'ACORN TO PC' enables you to change over painlessly. It shows clearly and quicly how, why and where the two systems (Acorn and MS-DOS) differ. As with a foreign language dictionary, you can use the book to transfer either way – from Acorn to MS-DOS, or from MS-DOS to Acorn.

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'ACORN TO PC' is written clearly and concisely by Dr. John Lockley, who has wide experience of writing and broadcasting. He is currently appearing as a regular contributor on Radio 5, and is co-author of 'The Complete BBC Computer User Handbook'.

Price: £15.95 (No VAT)

The Complete BBC Computer User Handbook

If you own a BBC B, B+, Electron, Master 128 or Master Compact, or Archimedes, then this is the book for you. It shows how to get the best from your machine, and how to make it work for you. The general style and level of presentation means that both the expert and beginner alike will feel comfortable with the quality and quantity of the material.
Subjects covered include the general use of computers, hardware design and peripheral devices like printers, disc drives, etc, and Networking. Programming hints and tips and various disciplines for making a better program are discussed in some detail, including debugging of specific errors. Standard programs are covered, such as wordprocessors, spreadsheets, databases, graphics, communications, etc., which brings you neatly on to the subject of using computers in the office or at work – even giving advice on writing and marketing your own programs.
A book you will enjoy to use as a reference, or read from cover to cover, over and over.

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The Complete Mouse User Guide to BBC Micro

This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.
It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included. These may be typed directly into the micro, without the need for any understanding of the hardware or software involved, enabling the mouse to be used for custom applications.

Price £5.95 (No VAT)

Example programs on Disc £4.95

Beeb PC (BASIC)

Beeb PC Basic is designed for program authors wishing to convert programs so that they will run on IBM personal computers. To convert BBC BASIC programs manually can waste days of valuable time with every occurrence of common statements such as PROC, DEFPROC, TAB, having to be changed.
Beeb PC (BASIC) automates many of these changes, and will convert majority of BBC statements that are invalid for IBM BASIC into equivalent acceptable statements. In addition BBC BASIC data files can be converted to IBM BASIC format, with support provided for all BBC data formats:- INTEGER, REAL & STRING.

Price: £38

Beeb DOS 3.0

(Now reads Archimedes Discs)

The BBC and IBM PC's are the most popular micros in the UK. The BBC is firmly established in the education sector and the IBM is the industry standard in the business world. The pools of information and applications held on these computers are immense, yet the means of passing information between them are very limited. Beeb DOS provides a practical method of transferring information between these two micros.

Beeb DOS is a collection of utilities which run on the PC's and enable it to read and write information on BBC discs. You can transfer files between your PC's 360K floppy, high density floppy or hard disc and your BBC discs. In addition Beeb DOS allows you to catalogue, format and compact BBC discs and delete, re-name, lock and unlock BBC files, all on PC's. Each Beeb DOS utility is written in IBM assembler and is run directly from PC or MS-DOS. The Beeb DOS utility can be run from floppy disc, hard disc or RAM drive.

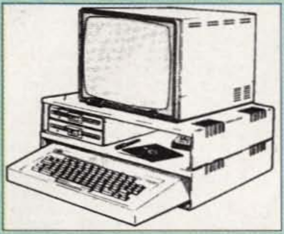
Beeb DOS is supplied on an IBM 5.25", 360K disc complete with a comprehensive operating manual. (Will only work on 360K Disk Drives & read only ADFS and Watford DDFS – not DFS).

Price: £39

(Please write in for technical literature)

Continued→ → → → → →

Plinths for the BBC B & Master 128K Micros



Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

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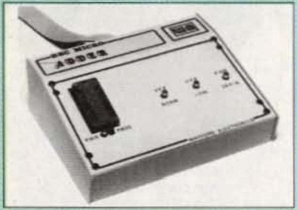
(Carr. Single plinth £2; double plinth £3)

ADDER



The Adder unit connects to the User Port and draws its power from there too. The EPROM is mounted in a top quality ZIF socket. There are no switches or controls as Adder is entirely software controlled.

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- Works with all standard filing systems. Generates header code for RFS ROMs to allow Basic programs etc. to be stored in EPROM. More than one file per ROM permitted.
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£65 (£5 Carr)

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EPROMs need careful treatment if they are to survive their expected lifetime. Over erasure of EPROMs very rapidly turns them into ROMs! The TEX erasers operate following the manufacturers specifications to give the maximum possible working life by not erasing too fast.

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Ideal for removing dust & dirt from Keyboard & similar inaccessible spaces. **£3**

Spares for BBC Micro

UHF Modulator	**£4**	16MHz Crystal	**£2**
Speaker Grill	**£1**	17.734 MHz Xtal	**£2**
Speaker	**£3**	32.768MHz Xtal	**£1**
Keyswitch	**£1.50**	BBC B Refurbish	
Master PSU	**£59**	Casing	**£25**
Master Keyboard	**£62**	Keyboard	**£46**
Master Casing	**£49**	Power Supply	**£59**

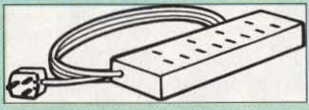
Replacement Flexible 17 way Keyboard Connector **£4**

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage transient spikes/surges caused by lightening or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets. Supplied wired up with mains plug ready for use. Can be screwed to floor or wall if required. Very useful for tidying up all the mains leads from your peripherals.

£9.50

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A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

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ROM Extraction Tool

This extremely useful tool allows you trouble free chip insertion and removal from your computer by distributing the removal force over the whole body of any 24 or 28 pin chip. **£2**

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SOLDER type **£1.50** IDC CRIMP type **£1.95**

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Increase the speed of your Disc Drives by soldering this switch to your BBC B or B+ keyboard

Only **£1.00**

---

28 pin ZIF SOCKET (Textool) **£6.95**

Connecting Leads

(All ready made and tested)

CASSETTE LEADS 7 pin DIN Plug

to 3 pin DIN Plug + 1 Jack Plug	£2.50
to 7 pin DIN Plug	£3.00
to 3 Jack Plugs	£2.50
6 pin DIN to 6 pin DIN Plug (RGB)	£3.00

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00;** Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	**50p**	**75p**
RS423 (5 pin Domino)	**70p**	**80p**
Cassette (7 pin DIN)	**40p**	**95p**
ECONET (5 pin DIN)	**35p**	**50p**
Paddles (15 pin 'D')	**150p**	**250p**
Disc Drive Plug 4 way	**100p**	–
6 way Power Connector	**120p**	**150p**

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

Watford POWER DUCK **£8**

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1 MB-10 DIL D-RAM	**£4.50**
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256K x 4-8 DIP	**£4.75**
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41256-10	**£1.50**
6264LP-8K	**£4.00**
6502A CPU	**£5.00**
65C02 3M	**£9.75**
65C12	**£9.00**
6512A	**£10.00**
6522	**£4.00**
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62256P-12	**£8.50**
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68B50	**£2.95**
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74LS00	**50p**
74LS04	**50p**
74LS10	**50p**
74LS123	**£1.00**
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74LS244	**£1.00**
74LS245	**£1.00**
74ALS245	**£2.75**
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75159	**£3.00**
9637	**£2.00**
ICL7673PA	**£3.00**

Assorted ROMS

ACORN ADFS	£25
ACORN BASIC 2 plus User Guide	£22
Acorn BCPL	£42
ACORN DNFS	£17
Acorn FORTH	£32
Acorn Graphics	£25
Acornsoft C Disc	£36
Acorn LISP	£19
Acorn OS B+	£25
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Basic Editor	£24
BBC PCB Designer	£49
Beebmon	£22
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Rom Manager	£20
ROMIT	£29
SERIAL ULA	£13
TED	£35
Termulator B, B+	£28
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Video ULA	£14
ULTRACALC II	£26
1Mb OS ROM	£39

NEW

Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's NEW Innovative IDE interface card brings the latest advances in PC hard disc technology to within reach of the Archimedes user.

Because of the integration of the controller and drive electronics onto one compact board, Watford Electronics have been able to include extra features into the drive, such as Caching, where tracks are buffered in fast memory, reducing access times and increasing throughput. All these benefits make IDE drives far more attractive than conventional ST506 drives or SCSI.

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Built in Non Volatile RAM to hold configuration
- LED activity indicator
- 37 way D type socket for external drives
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

*Commands

*IDELock
*IDEUnlock
! DEFS
Selects the IDE filing system 'IDEFS'.
*IDEDrives
Displays the configuration and native characteristics of installed drives.
*Configure IDEFSDirCache
*Configure IDEFSBuffers
*Configure IDEFSDrive

Typical transfer speeds

Prairie Tek	20Mb	650K bytes per second
Seagate	43Mb	800K bytes per second

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£249
ADA 0530	100Mb	16mS	£395
ADA 0570	200Mb	15mS	£535
ADA 0580	330Mb	15mS	£POA

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300	External Case & PSU for A3000	£85

Internal Hard Disc Drives for A3000

ADA 0700	21Mb	23mS		★£315
ADA 0720	44Mb	28mS	Available Soon	£TBA
ADA 0730	89Mb	18mS		£TBA

Supplied complete with Podule, Fan, Cable & Fitting instructions.

★ Tentative Launch Price

Archi IDE Hard Cards

"Simply plug and play"

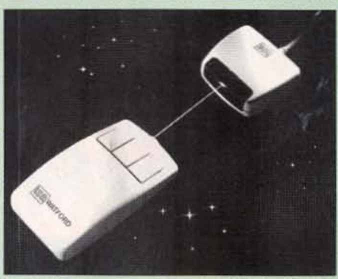
These revolutionary new hard cards for the A300 and A400 series Archimedes are unbelievably easy to install – you simply slot one into any vacant podule backplane slot in the rear of your computer. The fast 2.5" miniature hard drives are mounted onto the professionally designed cards, and are supplied with the fully Acorn-conformant IDE Filing System ready installed and ready to run. A novel feature of the hard cards is that they can be easily removed and transported to another Archimedes, for example to make a hard disc backup, or to transfer saved files from work to home etc. Security of files on the hard disc is ensured by our unique security password lock, which allows files to be read only, but not overwritten or deleted – ideal for use in school applications where the integrity of your master software needs to be retained.

ADA 0650	21Mb	23mS	£345
ADA 0660	44Mb	28mS	£495
ADA 0670	89Mb	18mS	£TBA

(Can be used as a Removable Hard Drive)

NEW

Archimedes Cordless Mouse



Ever found that using a mouse on a busy desktop has its problems? The cable is always being caught up in papers, tangled round equipment and other cables etc, and what about that cup of coffee spilled over your work!

Watford Electronics' new Cordless Mouse solves these problems by removing the cause for concern - replacing the cable with a simple infra red link. It still provides all the speed and easy control of a conventional mouse, but with complete freedom. In use, there are no operating differences between the standard mouse and the new cordless mouse so all mouse functions and mouse driven RISC software will be fully compatible. Pinpoint accuracy is ensured by a unique Accelerator button, which, when pressed, moves the pointer by just a tiny amount for a large slow movement of the mouse, but by a large amount for a quick wizz of the mouse.

Features

- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

Price £65

Watford Electronics are:

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- ARIES PC Dealer/Distributor
- Canon Authorised Printer Dealer
- Cambridge Computer Dealer
- Computer Concept Premier Dealer
- EIZO Monitor Dealer
- Microvitec Appointed Dealer
- NEC Appointed Dealer
- Panasonic Premier Dealer
- Roland Plotter Official Dealer
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Watford Electronics

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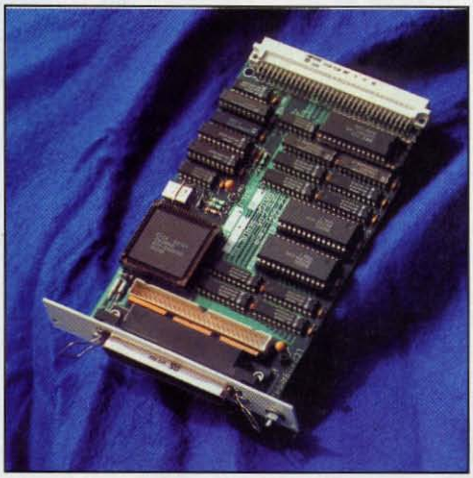
SCSI Hard Disc Drives, Tape Streamers & CD ROM...



The fastest hard disc interface for the Archimedes and A3000

Systems from as little as £219 (Archimedes) & £289 (A3000)

Free ArcTools disc utility software with every hard disc system

Dealer and Educational prices available

...call (091) 257 6355 and ask for Sales!

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One year ago, Morley Electronics decided to design and build a new SCSI interface card. The design objective was quite simple....to build the best. We believe that by manufacturing the fastest SCSI interface, utilising a quality four layer board and also making it completely ANSI Level 2 compliant, we have achieved our aim.

Two 16 bit interfaces are available. Our standard interface is extremely fast but for those requiring even faster data transfer, our cached card offers sustained transfer speeds up to 3790 KB/s (compared with a maximum sustained transfer speed of 2121 KB/s for our standard card).

The A3000 expansion card comes in a colour coordinated steel case which fixes to the rear of the A3000. The hard disc mechanism is enclosed in a separate steel case (also colour coordinated) with switch mode power supply and fan to ensure that the unit remains cool.

The 400 series expansion card occupies a single expansion socket and can support both internally and externally mounted devices. It is fully compatible and will coexist with any existing ST506 drive.

Each expansion card will support up to seven SCSI devices including hard discs, tape streamers, solid state discs, CD ROM players etc. (providing the appropriate software to drive them is installed).

The SCSI system is designed to comply fully with the ANSI X3.131-1986 standard and to give full Acorn RISC OS compatibility.

Full technical information (including data transfer speeds) are available on request.

INTERFACES*

A3000 SCSI Interface	**£169**
400 SCSI Interface	**£149**

SCSI DISK DRIVES*

Including SCSI interface, cable & leads. A3000 drives also include drive case and switch mode power supply.

A3000 20MB	**£289**
A3000 40MB	**£379**
A3000 100MB	**£579**
400 Internal 20MB	**£219**
400 Internal 40MB	**£299**
400 Internal 100MB	**£499**
Larger Drives	**POA**

400 External drives are the same price as A3000 drives.

TAPE STREAMER BACKUP*

150MB (with SCSI interface)	**£799**
150MB (w/o SCSI interface)	**£699**

CD ROM*

Coming Soon.
Phone for availability.

***Cached Interface Add**	**£50**

All prices exclude VAT & carriage.

MORLEY HOUSE, WEST CHIRTON, NORTH SHIELDS, TYNE & WEAR, NE29 7TY. TEL (091) 257 6355. FAX (091) 257 6373

Getting down to lower cases

THANK you very much for the excellent review of our IBM Ten Step and AAA Esso Five Star software in your July issue. However I would like a chance to respond to the criticisms that were levelled:

We accept slapped wrists for the instance of a program failing to respond to lower case. However this only affects the cut-down calculator utility – the main application behaves correctly.

The "untidy screens" are, I suspect, confined mainly to the BBC B versions where a large amount of information needed to be crammed on to a Mode 7 screen. The Archimedes versions make extensive use of much neater 80 column layouts.

I feel the "rude" and "unprofessional" error messages are quite clearly tongue-in-cheek and appeal to the sense of humour of most schoolchildren – and teachers.

In any case the messages only appear for scores which are highly implausible – rather than "very good" as stated by the reviewer.

Thousands of copies of these packages have been distributed over the years and the messages would have been removed had they caused any complaints.

Finally my contact at the AAA would like to point out that the Five Star system is suitable for both primary and secondary schools. – **Ken Read, October Pen, Little Hyden Lane, Clanfield, Hampshire PO8 ORU.**

Waiting for Karma

Was the April 1991 preview of the game called Karma an April Fools joke? – **David Roberts, Stockport.**

● No, it's real – but your guess is as good as ours as to when it will appear.

Printer confusion

I HAVE a BBC Master and want to buy a simple printer, but as I know nothing about them I don't know which to buy. I need a good basic model for my children to be able to print out their school homework and projects.

I have been advised that the Star LC-10 is a good buy. Is this true? Also is it just a matter of buying the printer and plugging it in, or are there other things to buy as well? – **Geoffrey Fowler, Surrey.**

● Printers can be a problem because there seem to be so many different types and makes. However the situation can be stated very simply.

In the basic range you have a choice between 9 or 24 pin machines. The former start at about £120 and the latter from £240, the difference being mainly print quality. Good, and reasonably priced, makes are the Star LC-10 and Panasonic KXP1081. You will need a printer cable – make sure you get it from an Acorn dealer, as the one required is not standard. The word processing software also affects results.

If you're using View you'll need to load the Epson printer driver. Other than that you shouldn't have a problem.

EMR helps

IN your August letters there were several questions relevant to EMT products:

● *EMR produce Scorewriter PMS for the Arc at £149 exc. VAT it will produce both sprite and draw files of music as well as print out direct. In conjunction with DTP products on the Arc this should be ideal for Mr. Hastie.*

● *For expanding an A3000 we also have the Tower 3000 which costs £260 and has slots for five expansion cards and its own power supply.*

By the way, at the Vangelis concert mentioned in the news the time control was done with our SMPTE control boards – usually used with Studio24 Plus version 2. – **Mike Beecher, EMR, Wickford, Essex.**

WANT to write to The Micro User? The address is:
Letters, The Micro User, Europa House, Adlington Park, Macclesfield SK10 4NP.

Writers of the most interesting letters receive a £10 prize.

Masterly compression

I HAVE a Master and I would like to know if it is possible to compress files to save space. If it is possible, how can I do it?

I am reasonably fluent in 6502 machine code, so that would not be a problem, should it be necessary. – **D. A. Jackson, Surrey.**

● We've run several articles on compression techniques and there are many ways of achieving good compression ratios.

Typically it should be possible to get better than 50per cent compression by using the appropriate algorithm.

The actual algorithm best suited for a particular application depends on the nature of the data being processed. For example, screen dumps

➤

SCSI vs IDE revisited

IN the September issue Mike Cook provided a reply to a question regarding the relative speeds of IDE and SCSI hard drives. He concluded that the 16 bit interface of the IDE gave it speed advantages over SCSI.

At Oak Solutions we have identified three areas that affect hard disc performance: The design of the drive and its onboard controller imposes the intrinsic upper limit to the data transfer rate, with intelligent drives such as IDE and SCSI performing better than non-intelligent ones due to the integrated nature of the controller.

The control bus used – SCSI, ESDI, IDE, ST506 and so on – imposes its own limit to the data transfer rate however, in practice, SCSI and IDE busses have a higher rate than the drives themselves so do not affect the final result.

The design of the host interface in Risc OS imposes its own performance restrictions in two areas: An inherent upper limit to the data transfer rate is imposed by handshaking techniques, cacheing and so on.

Also the requirement to service the data to and from the drive before the relevant sector of the disc has passed the head.

Our tests have lead us to the following conclusions:

● *8 bit Archimedes expansion cards, whether IDE or SCSI, produce a data bottleneck such that the hard drive is prevented from reaching its full transfer rate.*

● *Well-designed 16 bit cards – SCSI or IDE – can avoid this problem. The fastest SCSI drive we've been able to find sustained a data transfer rate of 2.1Mbytes per second through our SCSI card, although others we tested seemed to run out of steam when faced with extremely fast drives.*

Drive manufacturers tend to choose SCSI for their high performance drives as IDE is, strictly speaking, an internal system. – **Phil Driscoll, Technical Director, Oak Solutions, Cross Park House, Low Green, Rawdon, Leeds LS19 6HA.**

● Thanks for the information, what it comes down to in the end is later expansion. SCSI tends to cost more than IDE but with a SCSI you can expand later. You pays your money and takes your choice.

➤

are often made up of blocks of colour were a particular number represents a colour.

You might find, for example, that the first 60 bytes in the dump were all zeros. It would therefore be more economical to adopt an approach where the value of the byte is followed by the number of times it is repeated, in this 00,60 is stored.

Obviously whatever system you adopt will have to be reversed when you come to decompact the file.

Pilots with clipped wings

DO you know where I can get hold of a quality flight simulator like Aviator or Red Arrows for my BBC Master? I've been trying to get hold of these for ages but can't find them anywhere. – **R. J. Attwood, 17 Solent Road, Hill Head, Fareham, Hants PO14 3LB.**

● If you've tried all the usual suppliers we can't think where else you could go to, perhaps a reader could help.

Looking to the future, there is a rumour of a new flight simulator for the 8 bit range, but we have no details yet.

Infected A3000

I HAVE been having major problems with my A3000 lately. The computer does not seem to do do anything right. Very strange things have been happening over the past couple of months and I cannot explain them.

The computer has been giving me all sorts of errors including a disc error on the ram disc and a bad free space map after a newly formatted disc was put into the drive.

Once the operating system would not obey me and pointers and icons changed colour.

The problem seems to be affecting some of the applications as well. They have started to suddenly quit and without the slightest bit of notice.

The most frustrating thing about this is that it is so unpredictable. One minute everything is perfect and just when I am about to save something to disc the computer prints the message Please insert disc *but it doesn't say which one. The computer then fails to read the disc which is instantly out of use, so I have to throw it away.*

The problem has occurred in other circumstances ,but writing to disc seems to be the favourite way. – **Shanawaz Basith, Soton.**

● It sounds as if some of your discs have become infected by a virus. From the symptoms you describe we would guess that it is the **Icon Virus**.

This is a Basic program which pretends to be a sprite file in your disc directories.

!VKiller by Richard K. Lloyd is probably the best virus removing program and we supply it every month on our subscription disc.

It will remove all known viruses from your discs and protect them where possible from further infection.

The problems you are having with the disc drive seem to indicate a defective drive, although this might be a symptom of a virus. Certainly there is no reason to bin discs just because they are not formatted correctly – just re-format them.

Colour printing

AS I own a deskjet printer for which several firms now supply coloured ink refills for the cartridges, is it possible to get the machine to print in primary colours one at a time?

I could then print three times to produce a coloured picture. This is possible on PCs. On the same subject, does anybody produce a screen dump program?

I have all sorts of Acorn software but I am finding that I don't have the latest versions. Would it be possible for you to produce a list of the lastest version numbers and suggest a way to upgrade? Could it be included on the monthly disc? – **M Buckland, Northants.**

● Computer Concepts provide a piece of software called Expression which is designed to produce colour separations for printing. This might possibly be of use, although it's not really for this type of thing.

We do not know of any software designed specifically for this particular application as it would need to prevent certain colours being printed on each run.

As for software module versions, we contacted Acorn and with their help have compiled this list:

Modules	Version	Source
Shared C Library	3.50	Risc OS Extras
	3.75	with third party software
Colours	0.52	Risc OS Extras
FP Emulator	2.80	Risc OS Extras
Hourglass	2.02	Risc OS Extras
IRQUtils	0.09	Risc OS Extras
	0.12	TCP/IP Protocol Suite
WimpUtils	0.04	Risc OS Extras
Sound2	1.13	Risc OS†Extras
Font Manager	2.43	Font packs
	2.44	With third party software
Supersample	0.06	Acorn Font packs and with third party software

PC games on the Arc

I HAVE a BBC A3000 with PC Emulator and my cousin has an Amstrad PC 1640 with a 5.25in drive. What kind of disc do I need to run his games? Would the A3000 5.25in second drive from Morley Electronics work? – **L. Adams, Nottingham.**

● Any 80 track double-sided 5.25in drive that appears as a floppy when connected to the A3000 will be suitable. It should be accessed as the b: drive.

Idle PC

MY PC Emulator is not doing very much at the moment so I was wondering if you could tell me which software works with it. – **David Kirkham, Tyne & Wear.**

● It would probably be quicker to mention the programs that definitely don't. Anything that requires better than CGA graphics won't work, programs that don't follow the MSDos programming rules won't either.

Beyond that it's very difficult to say without testing. Most software will work.

The new PC Emulator allows up to EGA+ graphics and tolerates a certain level of naughtiness in programs as well as emulating a floating point chip to speed up certain operations.

However, beware if you are upgrading your emulator: The new PC Emulator package is supplied with MSDos 3.3, but the upgrade gets version 3.1. The Learning Curve pack with the new A5000 gets DRDos 5.0.

Missing copies

I AM writing to ask for your help in obtaining some missing issues of The Micro User which are necessary to complete our library collection, which runs from the first issue in 1983.

The issues we need are those from June to December 1990 inclusive, and February 1991. I hope that one of your readers may be able to help.– **Trevor Campbell Davis, 9 Cloister Road, London W3 ODE**

ALL programs printed in this magazine are exact reproductions of listings taken from running programs which have been thoroughly tested.

However, on the rare occasions when mistakes occur corrections are published as a matter of urgency.

Should you encounter error messages when you type in a program, they will almost certainly be the result of your own typing mistakes.

Unfortunately we cannot answer personal programming queries concerning these mistakes. Of course letters about suggested errors will be investigated without delay, but any replies found necessary will only appear in the letters pages.

The *Really Good Software* Company

KeyWord

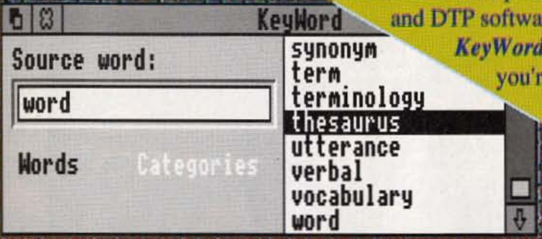
The Multi-tasking Thesaurus

Ever been at a loss for that vital word? It's on the tip of your tongue but just won't leap off on to the page?

Easy-to-use and compatible with all Risc OS word processors and DTP software.

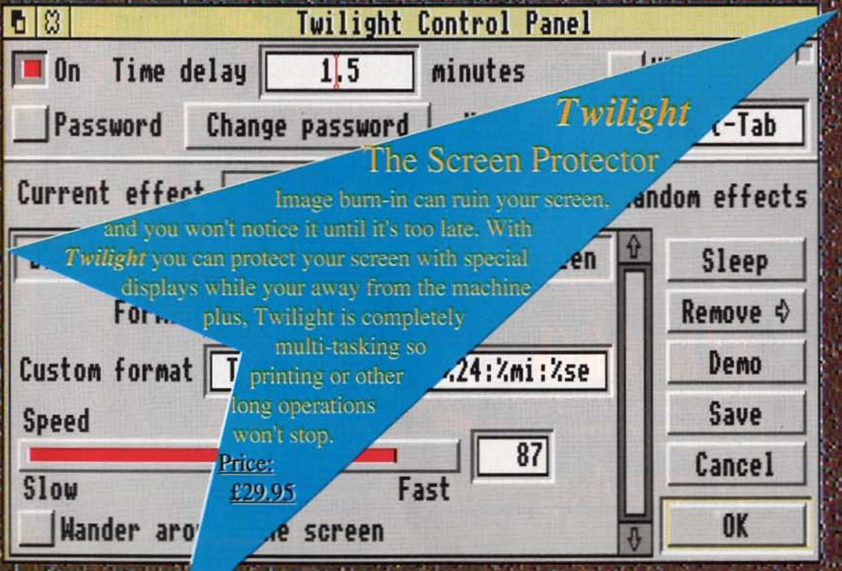
KeyWord has the word you're looking for.

Price: £29.95



Source word: word

synonym
term
terminology
thesaurus
utterance
verbal
vocabulary
word



☒ On Time delay 1.5 minutes

☐ Password Change password

Current effect

andom effects

Custom format ...24:%mi:%se

Speed 87 Slow Fast

☐ Wander aro... e screen

Twilight

The Screen Protector

Image burn-in can ruin your screen, and you won't notice it until it's too late. With *Twilight* you can protect your screen with special displays while your away from the machine plus, Twilight is completely multi-tasking so printing or other long operations won't stop.

Price: £29.95

MultiTTX

Our multi-tasking teletext software for the Morley Teletext Adapter.

Carry on working while you download pages. All the expected features including Hold, Reveal and save pages as text.

Price: £29.95

MultiLink

The only multi-tasking software that lets you transfer files to and from an 8 bit BBC Micro to the 32 bit machines with simple click and drag operations. Works with all Risc OS machines.

Price: £24.95

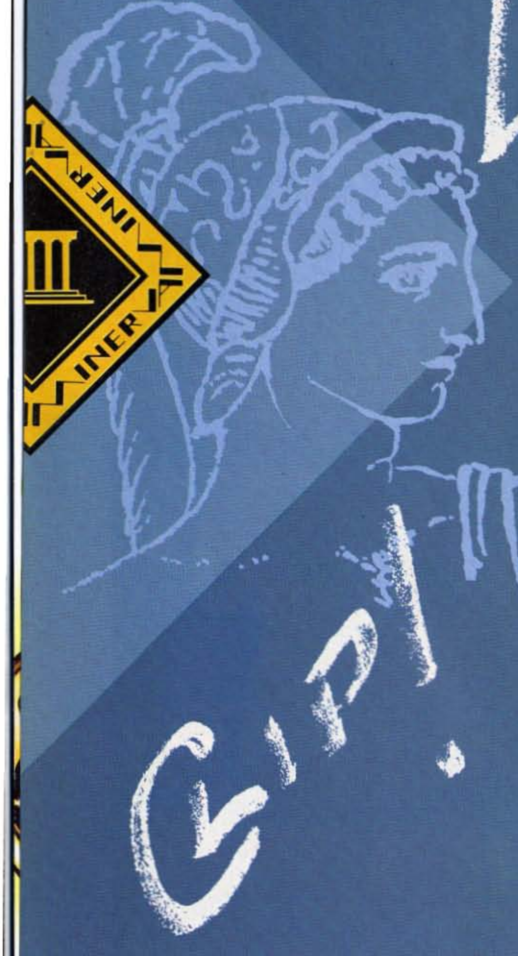
Connecting cable: £9.00

BBC A3000 requires serial chips to be fitted.

The Really Good Software Company, P.O. Box 60, Ashton-under-Lyne, OL5 9WW.

Look –

Minerva are probably the largest supplier of software for the Archimedes and A3000 computers. Minerva have built a reputation for software which is professionally written for power and versatility whilst achieving total user friendliness. Much acclaim has been received for their software including the 1989/1990 AU Award for the Best Art Package with Atelier.



ARCHIMEDES A3000 SOFTWARE

DESKTOP OFFICE

THE INTEGRATED SUITE FOR ARCHIMEDES

A fully integrated multi-tasking suite of database, word-processor, spreadsheet, charts and communications. Data can be transferred between the programs giving the ultimate in flexibility. The complete package for home or school use.

FLEXIFILE

The perfect database for education and small business users. FlexiFile is a new, powerful multi-tasking database with friendly screen displays. FlexiFile lives up to its name giving the user full flexibility with ease of use.

MULTISTORE

multi

The ultimate in database technology. A powerful database for the business or serious user.

MultiStore is a multi-tasking relational database allowing many database files to be opened at one time.

Rapid searches by any criteria, including 'sounds like' facility.

SYSTEM DELTA

The database for the serious home user or enthusiast, System DeltaPlus is a comprehensive database. Easy to use video style controls and the ability to define your own card layouts make this database suitable for all types of data entry.

ATELIER

This full art package exploits the 256 colour capabilities of the Archimedes allowing stunning graphics to be created easily and professionally. Sequences of these may be animated to produce amazing effects. Winner of the 1990 BAU award for Best 32 bit Art Package.

PrimeArt

A simple to use 256 colour art package designed for use with Primary level and Special Needs children. Menus can [illegible] tailored to suit ability [illegible] setups can be saved with pictures.

Home Accounts

Keep your home or club finances in order. Full control of multiple independent bank or building society accounts including credit cards. Also caters for standing orders and transfers.

Ancestry

A comprehensive genealogy package with fully definable records for various types of relationships. Zoom in on subject's card containing extra data regarding marriages and immediate family.

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The Light Fantastic

Steve Bruntlett prepares to bend light and space to bring you art

Product: Render Bender 2
Price: £135
Supplier: Clares Micro Supplies,
98 Middlewich Road, Rudheath,
Northwich, Cheshire CW9 7DA.
Tel: 0606 48511
Requirements: BBC A3000 and
Archimedes range

RENDER Bender 2 is the successor to the excellent, but sometimes difficult to use original version that employed a script language to construct scenes for ray tracing. Now the new version has enhanced the user interface quite considerably.

It offers three new programs creating a graphical front end. **Illuminator** lets you draw scenes using primitive objects, extruded or swept shapes and then save or drop them into Render Bender 2.

The new simplified front panel controls all the settings for ray tracing and for scenes created in Illuminator.

Animator galvanises ray traced scenes into action easily and quickly, offering windowed or stand-alone final animations.

Finally **Converter** enables you to convert Render Bender, ProArtisan and Illusionist files into sprite files. It also lets you convert animation files back into individual, normal or compressed sprite screens.

This is useful for looking at the construction of scenes from ray raced animations such as those available in the public domain. It's always useful to see how other people have produced images in order to improve your own skills.

Render Bender 2 comes in Clares' standard A4 cardboard wallet with a clearly written, well laid out and comprehensively cross-referenced manual.

The discs include a program disc containing the four main programs, Illuminator files, pictures and scenes. There's also a resource disc with animations, more Illuminator files, pictures and scenes including Toys and Soldier, which are two of my favourite Render Bender demos.

Have a go

The animations are a bit crude as they've obviously been done in Mode 13 at quarter screen size to save disc space.

However, the files are there if you want to see them full-screen in Mode 15 – or preferably Mode 21 – with a multi-sync monitor and hard disc. But they'll take a long time to ray trace at that size and resolution.

The whole package urges you to experiment and see how well Illuminator and Render Bender 2 work together.

After reading the manual and working through the tutorial, I produced a 10 frame animation of a nodding bird.

Now nodding birds are OK as far as they go – which is generally not very far at all – so I spent time looking at the other demo files, especially those featuring metal effects, which seem to epitomise ray traced images.

One of my main problems in approaching ray tracing is that it has always seemed an extremely technical pursuit, with little artistic merit in itself. Indeed like hypermedia it seems to be a solution looking for a problem.

After using Render Bender 2 for a couple of days I can say that it's a fascinating world to explore and one which can be used in many different ways, from attempts to model the real world to graphic animation as well as being a medium in its own right

If you are new to ray tracing there's a brief explanation in the manual which sets it out very clearly:

"If you create a ray traced picture, each pixel on the screen takes all relevant light sources and reflections into account. The resulting picture is absolutely correct according to the laws of physics and optics.

"All shadows, reflections and refractions are correctly calculated even if light is reflected off several surface. The picture that you create is just as it would appear if you created the scene using real objects and light sources".

There are obvious problems with that last sentence which I won't go into, but a realistic scene within the limitations of a microcomputer is what ray tracing is all about.

Loading the demonstration Bird file into Illuminator brings up a window containing the bird drawing. This is wire framed by default, but it can be changed to solid to give a better representation of the final result.

The Illuminator menu allows you to save work as an Illuminator file or as a scene which can be loaded into Render Bender 2.

The Select option allows you to delete, copy or move objects and set their colours and materials, including normal, shiny, metal, glass and mirror options.

The Enter option offers a range of basic solids and text plus spotlights. In addition there are outline and sweep options which allow the creation of irregular solid and rotated objects.

Using the Sweep Editor is straightforward. First you band a box of the size and proportion of the object you want to create. Then, drawing the right hand profile, you must decide if you want to see the inside of the object if it has one before the Editor completes the object and draws it in the number of steps you previously

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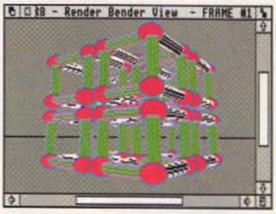
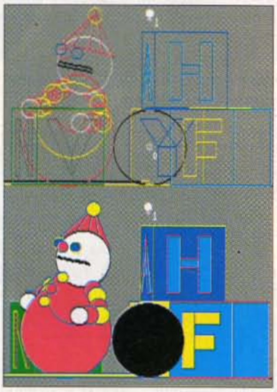
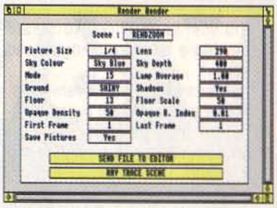
Toys galore



Wire frame/solid format in illumiator

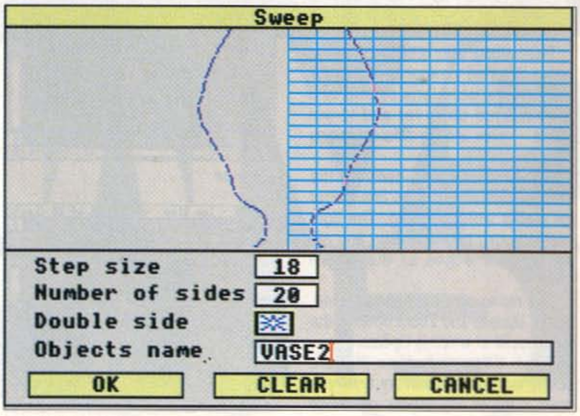

Ray traced rocking clown



Scene : RENDZOOM

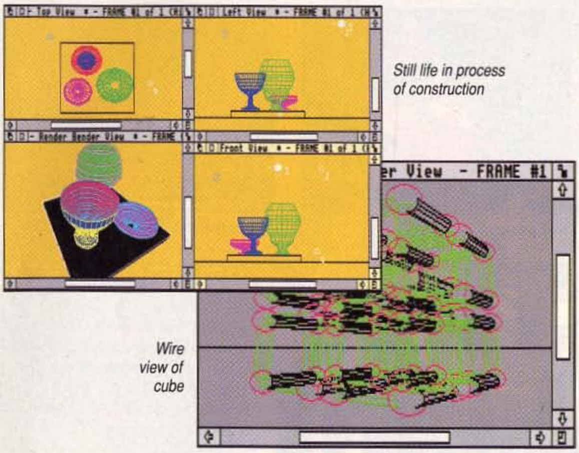
Picture Size	1/4	Lens	290
Sky Colour	Sky Blue	Sky Depth	400
Mode	15	Lamp Average	1.00
Ground	SHINY	Shadows	Yes
Floor	13	Floor Scale	50
Opaque Density	50	Opaque R. Index	0.01
First Frame	1	Last Frame	1
Save Pictures	Yes		

Render Bender control panel

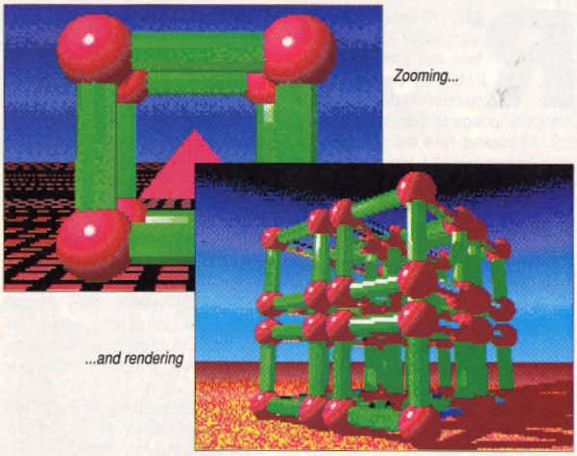


Step size 18
Number of sides 20
Double side ☒
Objects name VASE2

The Sweep editor


Still life in process of construction

Wire view of cube


Zooming...

...and rendering

➤

decided on. If the object is open at the top or bottom and only single sided the inside will be a void. If the two sides option is selected when it is drawn, you'll be able to ungroup the inside and outside and treat each with different colour and surface.

I did this with a goblet and two vases in a still life group but had problems with ray tracing the glass vase which had different surfaces. The goblet worked reasonably well, but needs more work.

One of my first attempts at using Illustrator was to experiment with one of the scenes provided to create something a bit more complex and dramatic.

I experimented with beamlights, spotlights and a general overall lighting effect called pointlight. The illustrations used here are the before and after images.

By using the Copy Menu to double the 3D shape, stacking a copy on top of itself and then placing a copy of those four 3D shapes behind, a cube of eight 3D shapes was produced.

This, along with different lighting and a distorted viewpoint – produced with the variable lens setting and user-defined observer and target points – gives a quite different image from the original.

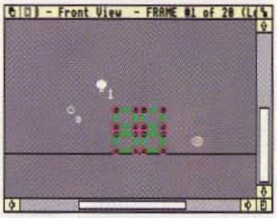
The Display menu controls the background and horizon line colour for clarity while drawing. The light positions can be toggled on and off, as can the edges of the drawn objects.

The menu also controls the Grid, Scale, Update and Zoom options, the most useful of which is Update.

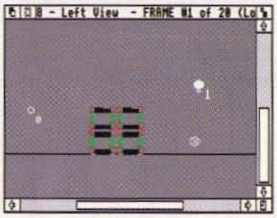
It can be turned off so that the scene isn't updated every time you make a minor adjustment, otherwise it can take a very long time on a complex scene, especially if you are using the View option.

The Views menu allows you to see the scene from the top or bottom, left or right, front or back or in any combination. Because you are working on a 3D scene using a 2D screen you need to be able to control the scene from three different angles.

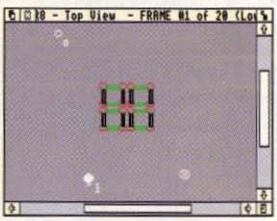
This is best illustrated by the following three illustrations which show the front, left and top:



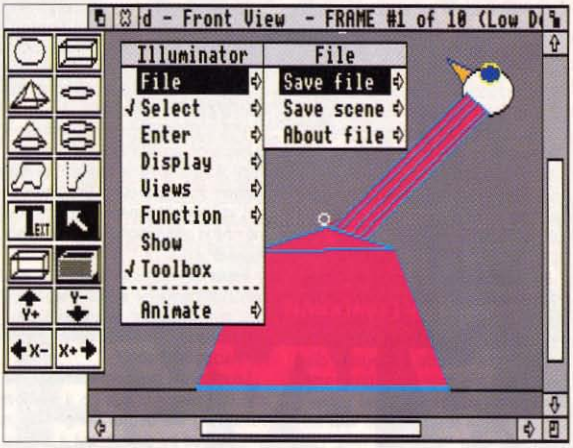
Front View



Left View



Top View



Render Bender control panel

In practice the use of these views quickly makes sense and is easy to get used to. The whole procedure is helped by having a couple of different views on screen at the same time as the main 3D view.

This helps with adjustments and makes sure the scene is exactly how you want it – as far as you can tell at this stage – before it goes to the ray tracer.

The only problem is that images sent to the ray tracer end up about 10 per cent smaller, so allow a bit round the edges or reduce the lens setting in Render Bender 2 before ray tracing.

The program is made easier to use by means of a control panel which has options for picture size, sky colour and so on. The lens size is carried forward from Illustrator, as is the view required.

Everything else has a default setting which you can redefine. The best way to use the control panel is to "proof" ray traced scenes at small sizes, in low resolution modes and without shadows to see if they turn out the way you hoped when you set the observer and lighting targets in Illuminator.

It takes quite a while to ray trace a scene, but when complete they can be saved as scenes or as pictures in sprite form.

Options

If you are working on an animation the whole series of scenes can be automatically ray traced and saved to a specified directory within the limits of disc space for later animation using Animator.

The picture size varies down to 1/1024th of the screen. The sky colour is available in 13 colours, while the ground is either matt or shiny.

The lens can be moved in or out of

➤

PINEAPPLE SOFTWARE

The Pineapple Software Real Time Colour Video Digitiser

The Pineapple Software Real Time Colour Video Digitiser is now supplied with not just one, but two fully multitasking application programs! In fact the software supplied with each Digitiser comprises at least four different programs, (the number is increasing all the time). Included in these is the !Micci application which is probably the most user friendly of all video processing programs. (See photo).

HARDWARE

The Digitiser hardware consists of a double width podule which plugs straight into the back of a 300 or 400 series Archimedes. (Note that a podule backplane is required in 300 series computers).

For A3000 owners we supply a special inexpensive adapter box which contains the digitiser card and plugs into the back of the A3000 using a ribbon cable.

Inputs are provided for PAL composite video and also R,G,B. Manual adjustment of Contrast, Saturation and Brightness provide for ease of initial setting up.

SOFTWARE

The Heart of the Digitiser software is a relocatable module which contains all the video processing routines. All of the previously mentioned software applications access these routines in various ways. For the user who can write simple BASIC programs this module provides easy access to all of the Digitiser routines via '*' commands and SWI's

The new multitasking software makes life very easy for those who wish to incorporate images into Wordprocessing, Desktop publishing, or Art packages. The ease with which grabbed images can be 'zoomed in' and 'cropped' to the required size has to be seen to be believed, and when the required part of the image is selected, it is then a simple matter to 'drag' the image directly into another application.

As well as providing it's own powerful processing routines the Pineapple Digitiser can just as easily use software such as ChangeFSI or AIM to process it's images giving unrivaled versatility.

Also now available in the Multitasking software is a routine to allow capture of a sequence of frames. The number which can be stored depends on the amount of memory you have available (and the size of image chosen), and when grabbed the images can be stored to disc or transferred to PAINT for analysis.

EXCLUSIVE FEATURES

The Pineapple Software Real Time Colour Digitiser is the only one currently llable with the following exclusive features:-

1. 16 bit operation (extended version) for smoother colour graduations.
2. Two independent multitasking applications plus other powerful software.
3. Digitising of the full video area normally displayed on a TV screen.
4. R,G,B inputs providing higher quality pictures from professional video equipment.

SPECIFICATION

Video Inputs	Pal coded video. 75 volts – 2.5 volts pk to pk. R,G,B, & sync input All inputs may be terminated by internal DIP switches.
Resolution	512 x 256 pixels
Storage system	Standard version 4 bits Red, 4 bits Green, 4 bits Blue – 192k Ram Extended version 5 bits Red, 6 bits Green, 5 bits Blue – 256k Ram
Picture Area	The Digitiser hardware allows the full screen area normally viewed to be stored in the podule ram. Horizontal shift, Vertical shift and width can be adjusted internally if required.
PAL Decoder	The PAL decoder provides manual control of Brightness, Contrast and Saturation, combined with full auto saturation control.

PAL COLOUR CODER

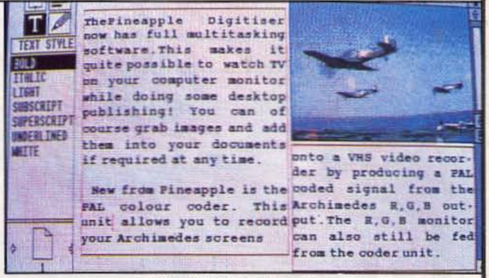
A new hardware product now available from Pineapple is a high quality colour coder video unit. This unit produces a full colour coded video signal from the Archimedes computer which enables you to feed the output of the computer into a video recorder or second colour TV monitor.

FEATURES:-

1. External to computer – no podule slots required.
2. Complete sync pulse regeneration to provide the best possible signal for recording onto VHS recorders or displaying on TV monitors.
3. Switch selectable to 624 or 625 line operation – for interlaced or non-interlaced screen modes.
4. Plugs into R,G,B, computer socket and provides buffered output to feed Archimedes monitor, + coded signal output.
5. Adaptable for use with other computers or R,G,B, and Sync signal sources.

S'VHS Version £79.00

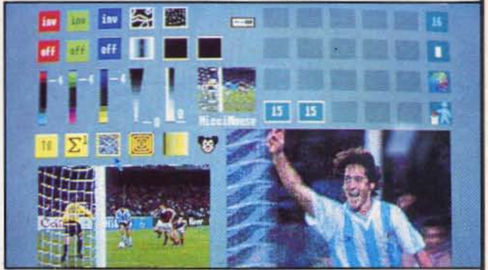
Price £69.00 + VAT p&p free



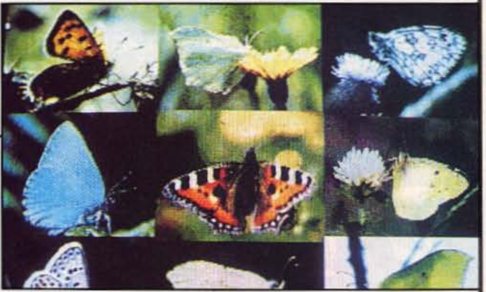
ThePineapple Digitiser now has full multitasking software.This makes it quite possible to watch TV on your computer monitor while doing some desktop publishing! You can of course grab images and add them into your documents if required at any time.

New from Pineapple is the PAL colour coder. This unit allows you to record your Archimedes screens onto a VHS video recor-der by producing a PAL coded signal from the Archimedes R,G,B out-put.The R,G,B monitor can also still be fed from the coder unit.

!Digi Multitasking Application



!MICCI Application



Butterfly collection

– 'Pineapple has produced one of the 'ultimate' Computer Video Digitisers' –

– 'The Pineapple Colour Digitiser looks to be one of the most professional products yet to be seen on the Archimedes' –

Acorn User – April 90

Digitiser Prices

Standard	**£285.00**
Extended	**£315.00**
A3000 Adaptor Box	**£65.00**

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NEW LOW PRICES!!!

BBC PCB Designer

NEW LOW PRICES!!!
NEW LOW PRICES!!!

This ever popular Rom based PCB designer is suitable for all BBC micros. It's fast high density 1:1 scale print routine allows prototype boards to be made directly from a printout, and a 2:1 scale print may also be used to produce professional quality boards. A second Eprom is optionally available to add a powerful auto-track routing facility to the program. This utilises a 'rats-nest' input rountine and allows any component to be 'picked up' and moved around the board without having to re-specify component interconnection.

The full auto-route facilities are available even on a standard unexpanded model 'B'.

'PCB Autoroute is remarkable. No similar software comes near the price. *Acorn User* – Aug 88

PRICE	EManual track routing	£55.00	
	Auto track routing	£85.00	
	Plotter Driver	£35.00	P&P free

still available at new
discounted price!
DIAGRAM II £25.00 !!!

Marconi Tracker Balls

RB2/101	BBC 'B' & 'B+'...£45.00 inc software
RB2/101M	Master ....£45.00 inc Pointer Rom
RB2/115	Archimdes £45.00
RB2/110	Nimbus................£45.00

Replacement lead to convert 101 series to Archimdes. £12.50

Postage & Packing on Tracker Balls £ 1.75

BARCLAYCARD
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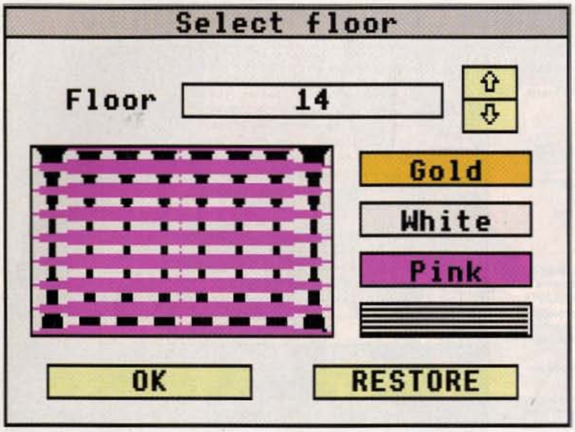
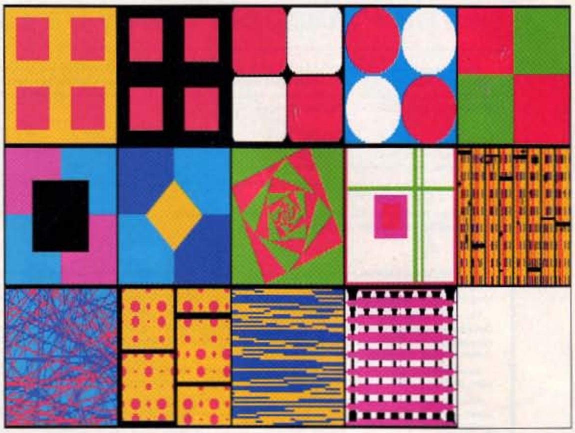
Access


Select floor
Gold
White
Pink
OK
RESTORE

Floor 14

Floor pattern designer



Examples of tiles provided

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the picture in the same way as a zoom or telephoto lens and the sky depth can be set to give different background lighting conditions in any of the selected colours.

The brightness of the ray traced scene is controlled by setting the strength of the lighting, with optional shadows adding to the illusion of realism.

The floor scale available from the control panel menu can be changed to give larger or smaller tiles. These are selected from a range of 14 whose colours can be cycled through to give different colourways.

Tiles can also be created by the user from existing sprites by dropping them on to the Render Bender window – though the palette will probably change in the process.

They can be designed from scratch too using the utility supplied with the package before your usual paint package. This ensures that sprites designed in this way will retain their colours when used in Render Bender 2.

The opaque refractive index can be set to determine how much the light is bent when it passes through glass objects.

Also available from the control panel are Fast or Normal Trace. The Normal setting allows you to use Risc OS applications while ray tracing. On the other hand using the Fast setting allows you to dedicate the whole machine to the ray tracing process, which is obviously quicker.

I started writing this review while the scene I was working on was compiling, which slowed down typing considerably. But when the scene was actually being ray traced line by line the word processor worked reasonably normally.

Ray tracing can realistically be carried out as a background activity, which is very helpful.

Moving Images

Animator is simple to use and requires only that you drop one of your series of saved pictures on to the Animator icon or into the Animate Files window. The pictures are then listed in numerical order and the first frame repeated to give a continuous animation cycle.

The order of the pictures can be changed to give backwards or forwards animation or indeed in whatever direction you want. The compiled animations can be viewed straight away and checked before saving as windowed or stand-alone animations.

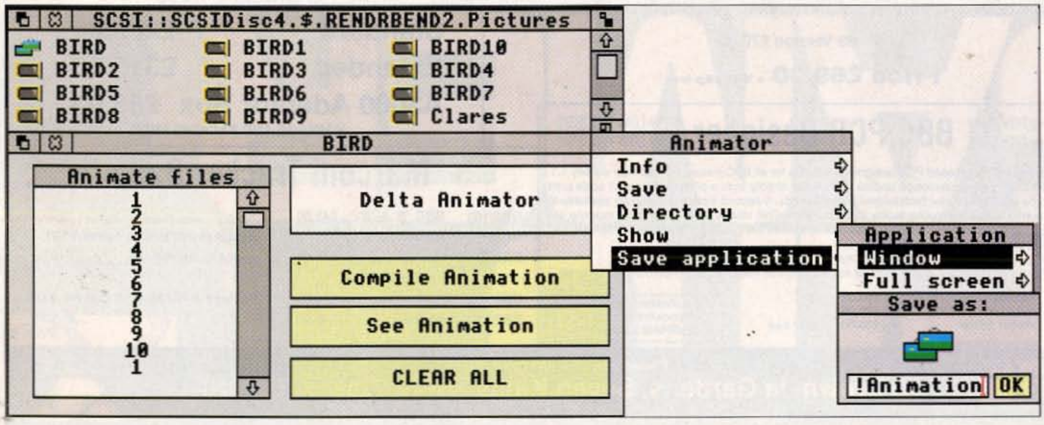
Because of Delta Compression, only parts of successive pictures which are different are saved. The results generally take up less disc space than the originals so you can drop in more than one disc full of pictures before the animation fills up a disc.

When scenes are ray traced by Render Bender 2 the process stops when a disc is full and continues with the numerical sequence when a new disc is inserted.

Summing up

Render Bender 2 is a joy to use. It can be frustrating at times having to wait a long time for complex scenes to be ray traced but generally it's well worth the wait.

It may have been the experts and the whiz kids who produced the most technically advanced demos with Render Bender, but with Render Bender 2 I expect the general Archimedes user turn outthe most artistic ones this time round.


SCSI::SCSIDisc4.$.RENDRBEND2.Pictures
BIRD
BIRD1
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BIRD7
BIRD8
BIRD9
Clares
BIRD
Animate files
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10
1
Delta Animator
Compile Animation
See Animation
CLEAR ALL
Animator
Info
Save
Directory
Show
Save application
Application
Window
Full screen
Save as:
OK

!Animation

The animator in action

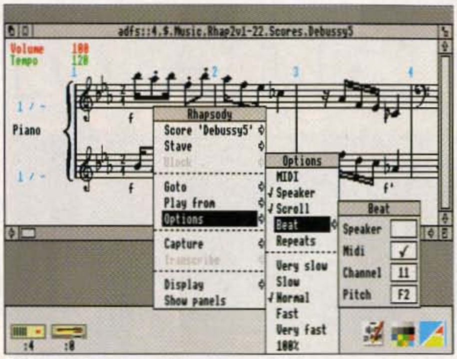
Easy listening

Ian Waugh rings the changes with Rhapsody II

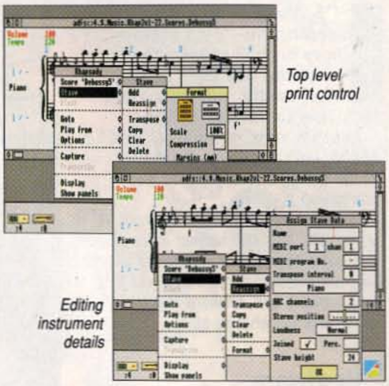
THE first version of Rhapsody was released about a year ago. It lets you write music on the stave using the mouse and/or a Midi keyboard. Playback can be channelled to the Arc's internal sounds or a Midi instrument.

A major feature is the ability to print out the score – something Maestro can't do – and coupled with an attractive price this made it a favourite with educational as well as home users.

However, as with all products, Rhapsody attracted a list of wishes and wants from users. Rhapsody II (review version 1.22) contains over a dozen new features which have been implemented as a direct result of user feedback.



Adding a beat



Top level print control

Editing instrument details

The major update is the ability to drag notes on to the stave from the Panel window. This is a great improvement over the rather clumsy method of lining up a cursor on the score.

Several other changes will please anyone using Rhapsody with Midi. It now supports multiple Midi Outs – but only if your Midi interface has them, of course.

You can insert a program change at any point in the music and transmit a program change for each stave before playback to set up the correct sound.

While this will serve most synths and expanders admirably, it's worth pointing out that many new instruments are now using Midi bank change messages which Rhapsody doesn't support.

A Midi Thru function retransmits data arriving at the In socket back through the Out socket. This is ideal if you are using the system with a second synth or expander, although you really need to be able to switch Local Off on the master keyboard to prevent its notes feeding back on itself.

When capturing data – recording in real time – you can now transmit the metronome tick via Midi and the Transcribe window which converts this into music which now has triple quantisation settings.

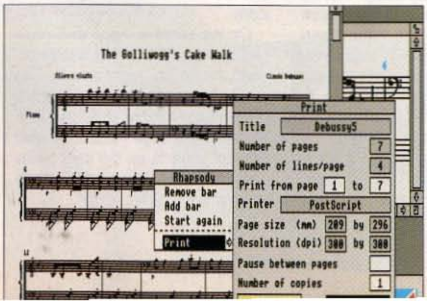
Product: Rhapsody II
Price: £61.95 (inc VAT). Upgrade from Rhapsody I £15.50 (inc VAT)
Supplier: Clares Micro Supplies, 98 Middlewich Road, Northwich, Cheshire, CW9 7DA.
Tel: 0606 48511
Requirements: BBC A3000 or Archimedes range

You can also record from a Midi instrument in step-time, selecting note durations from the Panel or with the function keys. Triplets and chords are supported, although velocity data is not.

Score format settings are now stored as part of the file. You can set margins and alter the spacing between the staves.

Options such as the number of staves and the display size can be saved in a configuration file to be set automatically on loading the program.

The printout window gives more information about the printer driver and offers multiple copies.



Print

Title: Debussy5
Number of pages: 7
Number of lines/page: 4
Print from page 1 to 7
Printer: PostScript
Page size (mm) 209 by 296
Resolution (dpi) 300 by 300
Pause between pages ☐
Number of copies: 1

Extended print dialogue

The sprites have been redefined using Mode 19 to give improved printout resolution. However, the spacing and alignment of some symbols is either out of line or incorrect. Beams, for example, can overlap the stems they are supposed to join and some ornaments sit on note stems instead of above them.

OK, so it's still readable, but it loses brownie points, especially as the program is in its second incarnation.

Superior printouts are promised if you export the files and load them into a new Clares program called ScoreDraw which should be available soon. Shouldn't really be necessary though, should it?

Other enhancements tend to be of a minor nature, although nonetheless welcome for all that. You can now remove a score from the score list without having to overwrite it. You can set the playback speed as a percentage of the original tempo from 20 to 200 per cent.

There is an octave transposition symbol and a fermata – which the manual calls a pause icon – plus a block retail function which lets you flip the stems on a group of notes rather than having to do them one by one. The only problem I encountered during use was to have the program vanish while it was playing music and I was messing about with the formatting. Serves me right for multi-tasking, I suppose.

The update consists of a new disc and a 20-page addendum to the manual. Existing Rhapsody owners must return their program disc – not the complete package – with the upgrade fee. New buyers may be slightly put out to receive the original program plus an addendum which gives the impression of a list of corrections. At least they'll have to print a new manual with version III – two addenda would be too much!

Rhapsody II costs £12 more than Rhapsody I, although the upgrade is £15.50. I think it would be nice if loyalty was rewarded by allowing existing customers to upgrade for the price difference.

Summing up

If you are currently using the original Rhapsody I can certainly recommend the upgrade. If you want something more sophisticated than Maestro then Rhapsody is the only thing between it and a full-blown Midi system.

The new method of note entry is a vast improvement. The printout, too, is better although still a tad messy in places. However, at the price, Rhapsody is one of the cheapest music programs for the Arc and very useable. That it's Midi compatible and can print out scores is a bonus.

State of the Arc

Steve and Pam Turnbull report on the latest addition to the Acorn range

IT'S been rumoured for months, so-called secrets have been exposed and its existence has been denied vehemently. But now *The Micro User* can reveal the truth.

Acorn's new computer, the A5000, isn't based on the A3000 shape but is a newly-styled three box set-up.

Gone is the snazzy up-turned nose of the 300 and 400 series, instead you get a bland front in shades of grey which lacks impact. However it's the hardware and software that matter so let's see what it's got.

Hardware

The machine's power is delivered by the ARM3 processor running at 25MHz, and the chip is surface mounted as there's nothing to upgrade to at the moment.

The memory is faster and comes in 1Mb or 2Mb versions. Both systems are upgradable to 4Mb and although Acorn have no plans to provide an upgrade, third-party suppliers will no doubt have them available as you read this.

The usual ports line up at the rear – parallel printer, serial interface, video and RGB outputs, headphones and Econet. In addition the keyboard plugs in round the back.

There are four standard expansion slots as before and there's also an additional reset and mouse socket, although they are not supported as yet.

Permanent storage comes in the form of a high density floppy drive for both versions and a 40Mb IDE hard drive on the 2Mb one.

Apparently Acorn's research has suggested that 40Mb has the optimum cost/size ratio, however the nature of IDE means that it should be very easy to replace with a bigger drive and IDE supports two hard drives anyway.

In fact the software will support at least four floppies, two IDE hard drives and four SCSI drives.

The floppy disc itself means big changes: It will format appropriate discs to 1.6Mb – twice the current size.

The software has been modified so that PC and Atari ST discs can also be handled automatically – they come up in a Filer window just like standard ADFS discs. You can also create discs with these formats. There's a space below the standard floppy for a second one.

Risc OS 3

The full monitor range is supported and, according to the specification – which we weren't able to check – the type of monitor is recognised automatically.

The most important feature of any computer is not how much power it has, but how easy it is to use, and that is controlled by the operating system.

As the screen shots on the following page show, there's not much dif-

Built-in applications run faster in less space

Eight applications are located in rom in the Resource Filer: !Alarm, !Calc, !Chars, !Configure, !Draw, !Edit, !Help and !Paint. As a result they need less space to run – !Edit uses less than half its original requirement. The applications also load much faster, for example !Draw loads up in about a second.

!Alarm has been updated to allow more complex forms, so that you can issue daily messages only on weekdays or run tasks – something the original could do if you knew how – and so on.

!Calc seems to be virtually identical to the application that appeared on the Apps 2 disc – just a simple calculator that's instantly available. However, a scientific calculator will be supplied on disc.

!Chars allows the selection of obscure font characters by clicking in its window. They are then typed into a document that contains the caret.

!Configure has been altered beyond recognition. On running it presents a window containing icons – like the Filer – for various areas of the machine such as discs, printer, keyboard, mouse, windows, fonts and so on.

Clicking on one brings up a further window containing the configure information. For example, the number of hard and floppy drives can be altered rapidly and the various outline font parameters modified.

These windows reveal some of the subtle changes to the whole system. For example the windows section provides an option that allows any window to be dragged off the screen, regardless of the individual window flags.

For the keyboard the previously unavailable – except via the command line – options for setting the Caps and Shift lock at switch on.

!Draw has been radically modified, although on the surface it appears the same. The simplest addition is key shortcuts – Control+X will now delete the current selection.

But there's more. The new font manager can draw on angled base lines so the new !Draw will now rotate outline text – see the pictures. Sprites can be rotated too. Text can be edited properly, although we didn't test whether you can edit it while rotated.

!Edit has had a small amount of enhancement allowing proper tabbing and word wrapping, and the search and replace facilities have been improved further. There's also some specialised support for handling Basic programs.

!Paint has improved, for example the colours and toolbox windows are displayed automatically when a sprite is opened for editing – but, stupidly, the palette window always opens in front of the sprite window which for 256 colour sprites obscures the image.

You still can't edit the palette from the palette window.

The screen grab facility has been replaced by a snapshot which can also be timed, so that you can set it going then set up some menus before the screen is saved.

!Help is much as it was on Risc OS 2 but has been extended to allow information to be displayed for menu entries as well as windows and icons.

On the supplied Apps disc you'll find all the software that was previously found on Apps disc 2. The game Lander has not been changed, but runs much more smoothly while !Patience has been modified to give different patterns on the card backs and a couple of other enhancements for playing the game.

ference between Risc OS 2 and Risc OS 3 on the surface – you really won't notice anything until you start to use it.

Perhaps the most obvious feature, looking at the bare DeskTop, is that the Archimedes logo is missing, being replaced by the Acorn one. In fact the Archimedes logo does not appear anywhere on the machine. However it is still the Task Manager icon, although the options available have been extended.

To start with, you can just click the icon to bring up the Tasks window. In this window you'll find some new module tasks: Resource Filer, Free and Pinboard.

The Resource Filer has been added to handle the eight applications that are now permanently in rom. The icon for this appears on the left of the icon bar and clicking it brings up the *Resources:$.Apps* sub-directory from which you can double-click the applications you want to run.

There are two other directories, $.Fonts, which contains the three built-in font families, and $.Resources which holds not only the message, window template and help files for the built-in applications, but also the resources for all the software modules.

This completely unifies the operation of Risc OS 3 and means that only these files in rom need be changed when altering the system for other languages.

The new task Free is used to display the amount of free space on a disc when the appropriate menu option is selected.

Pinboard is a built-in version of all the popular backdrop programs. It allows you to drag files and applications on to the DeskTop itself and load or run them from there. A single sprite can be used as the backdrop.

There's also an *iconise* option provided by the Wimp system itself by clicking Shift+Select on the close icon of a window.

This converts the window into an icon on the backdrop. It can be reopened by double-clicking it. New applications can communicate with the Wimp telling it what sprite to use for the icon and what name to put under it. Iconised Risc OS 2 documents will be given a default icon and name.

The state of the Pinboard and the rest of the DeskTop can be saved via the Task Manager window so that the same status and applications are reloaded automatically on start up the next time.

The need to manually save is not as elegant as the Apple Macintosh operation which automatically saves the whole state of the machine. But it does mean that if more than one person uses the same computer they can have their own DeskTop setup which they can load up when they start work – there's nothing worse, on a Macintosh, than coming back to your machine only to find someone else has been altering your options.

A shutdown option has also been added. You should always use this before you switch off your machine as it ensures all the current applications are closed properly.

You are also warned if any data is unsaved, and if you're on a network the machine is logged off properly. In addition the heads of any hard discs are put into the park position so they can be moved safely. It's a nice addition that's commonplace in the PC market and standard on the Mac.

Finally there's the task window option, previously found in the !Edit icon bar menu. This creates a window in which you can issue operating systems commands and even run non-multitasking programs in the DeskTop environment, as long as they don't use graphics.

Acorn's prices

A5000 1Mb	£999 exc. VAT
A5000 2Mb, 40Mb hard disc, multiscan monitor	£1499 exc VAT
A5000 LC 2Mb, 40Mb hard disc, multiscan monitor and software	£1776 inc VAT

A typical 40Mb IDE hard drive and multi-scan monitor would cost £575 excluding VAT.

The Filer

Although superficially the Filer has not been changed, you'll soon find differences: Copy, Delete, Move, Format and Verify are all multitasking, so you can initiate a copy operation and then just get back to work.

The Filer submenu has been dramatically extended to include the ability to set types, date stamp, and issue file finding commands. Copy itself has now been changed to provide a save box which you can drag to another Filer window.

These changes have two effects. The first is there's now a risk of removing a disc while a copy is in progress – a silly thing that is bound to happen when you forget what's happening.

It was less likely to occur before because you had to stop using the machine while this was in progress.

The second effect will only apply to experienced Risc OS 2 users, and that's the time delay on floppy operations. When deleting a file the multitasking process is started up and the menu disappears. But the file is still showing in the window.

The natural Risc OS 2 user's reaction is to assume the file is locked and go to click menu again. At which point, the file icon vanishes. It's very disconcerting at first.

Printers

Another area that has received the heavyweight treatment is printing: Acorn's system of printer drivers for Risc OS 2 was remarkable in itself, but you still had to choose which driver you wanted to use and could only have one available at a time.

The all-new printer driver system is even better. There's now only one, universal printer driver with a system of configuration files for each printer type.

More than one file can be loaded at any one time and they can be routed to different ports on the machine.

So you could have a dot matrix connected to the parallel port, a laser

➤

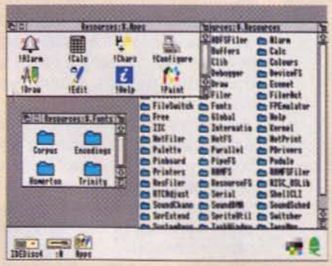
Death knell of the 400 range?

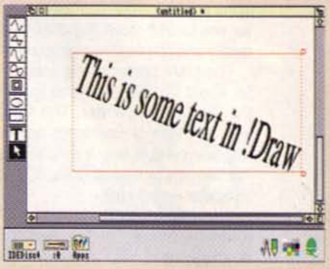
So who will by this machine? Acorn have said that their target market is higher education and computer-literate professionals who want a good machine but need PC functionality – the PC Emulator runs about two-thirds the speed of a PC AT which is pretty good.

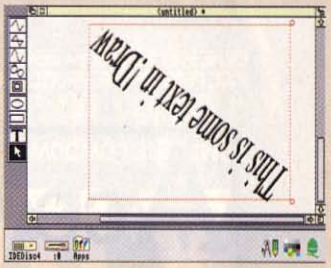
However, we feel this target group is hardly realistic. Compared to the 400 series, this is a faster machine with a better operating system and the same expansion slots and ports.

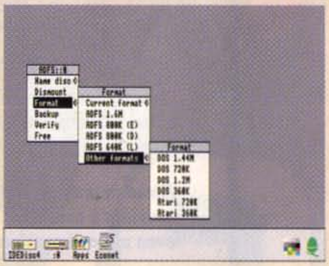
Larger dealers are almost certain to provide low-cost, if not free, upgrades to 2Mb or 4Mb, plus incorporating hard drives probably at half Acorn's price differentials.

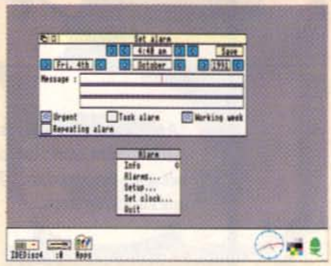
We can't see any reason at present for continuing the 400 range in any of its incarnations. Anyone with enough money to buy a 400 series machine will buy an A5000 instead.











machine. So you could have a dot matrix connected to the parallel port, a laser on the serial, an inkjet via Econet and, perhaps, a direct laser system too.

Each printer has its own icon and you can just drag the document to the printer you want to use. There's a proper print queueing mechanism, and the universal printer driver multitasks so that you can work while printing continues.

With the new system you can load the same printer driver twice – two icons appear on the icon bar – you can set one to draft mode, the other to high quality and just use the one you want.

There are printer configuration files for about 70 different types including the Apple LaserWriter. The trouble with this type of Postscript printer is that you need to buy a special printer font to match each one on your computer – until now.

Another utility is provided that allows a bitmap of the font to be downloaded to the LaserWriter when needed. This isn't the optimum solution, but it will handle any unusual or unmatchable fonts.

A5000 Learning Curve

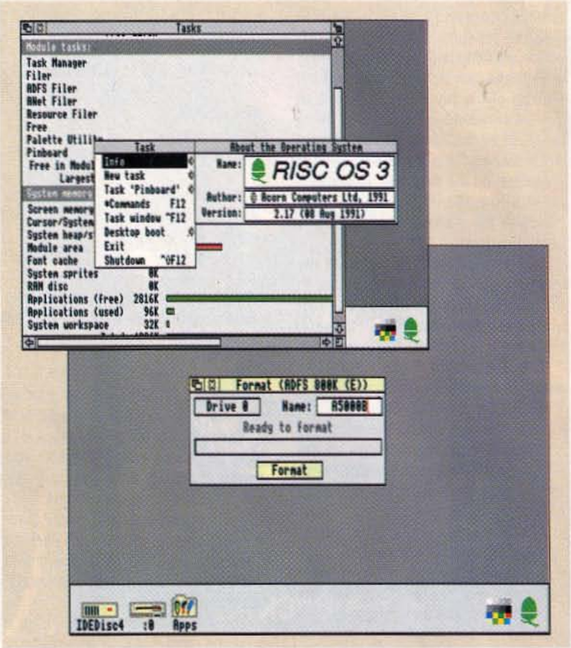
An A5000 Learning Curve Pack will include the wordprocessor 1st Word Plus, hypermedia product Genesis Plus, Acorn DTP, the PC Emulator with DR Dos 5.0 and two commercial games.

Summing up

We have only been able here to provide an overview of the new hardware and software which has had over 300 enhancements of a major nature.

Once again the best feature is that, initially, there is little perceptible difference between Risc OS 2 and Risc OS 3. Those improvements that exist are often so subtle that all you'll notice is a slight feeling of "... that was easy".

The A5000 is a quietly excellent machine.


Tasks
Module tasks:
Task Manager
Filer
ADFS Filer
ANet Filer
Resource Filer
Free
Palette Utilit
Pinboard
Free in Modul
Largest
System memory
Screen memory
Cursor/System
System heap/s
Module area
Font cache
Task
Info
New task
Task 'Pinboard'
*Commands F12
Task window ^F12
Desktop boot
Exit
Shutdown ^⇧F12
About the Operating System
Format (ADFS 800K (E))
Drive 0
Ready to format
Format
IDEDisc4
:0
Apps

System sprites 0K
RAM disc 0K
Applications (free) 2816K
Applications (used) 96K
System workspace 32K

Name: RISC OS 3
Author: © Acorn Computers Ltd, 1991
Version: 2.17 (08 Aug 1991)

Name: A5000B

Ace Computing

Einstein=Multi dimensional C^{2}_{ad}

Coming soon from the makers of *Euclid, Mogul, Splice, Tween* and *ArcLight,* is an addition to the range.

Einstein is a new tool for editing Space-Time, which provides a consistent approach to editing in 2, 3, 4 or even more dimensions.

"Any discussion of design with the Archimedes must include what has virtually become the standard 3D graphics and animation system.

I mean of course the *Euclid/Mogul/Splice* trio of packages from Ace Computing. *Euclid* is a Risc OS compliant, interactive, multi-document, 3D, graphics and animation program which is so easy to get to grips with.

Designs can be put together, rotated in real time, zoomed in and out of and viewed in perspective from any position...

...It is interesting to note that the next set of BBC TV's *Science Challenge* programmes employ *Euclid* graphics."

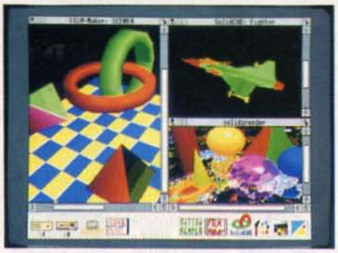
CHRIS DRAGE Education section
BBC ACORN USER February 1991

Ace Computing

SILICON VISION

DESKTOP SOLUTIONS FOR THE ARCHIMEDES & BBC A3000

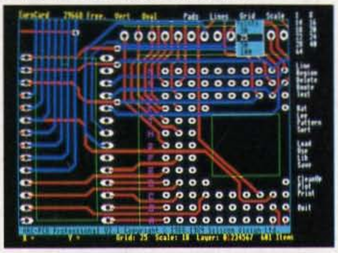
SolidTOOLS



The first fully integrated environment for 3D CAD, Photo-realistic rendering, Interactive animation, Texture mapping, Programmable animation and high resolution hardcopy to printers and plotters taking designers to new heights of design productivity and performance exceeding the capabilities of 'heavy-weight' packages on PC-compatibles and workstations which cost considerably more. The software provides 3D CAD facilities for Architectural, Engineering and Interior design offering a turnkey solution satisfying all your conceptual design and presentation requirements.

"Puts Silicon Vision at the top of the CAD market"
- A&B Computing November 1990.

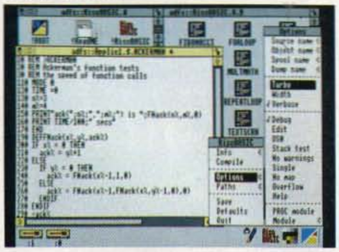
ARC-PCB Schematics



The ultimate Electronic design package providing both circuit drawing and pcb layout in one design interface for a fully integrated system that surpasses all other PCB design systems in features & speed of operation for the fastest turnaround from concept to finished board design.
Features include Component schematics, Free-form circuit drawing, Automatic routing, Rats-nesting, Multiple-layers, Oval, Circular & Surface mount Pads, Component Pulling, On-line Help, Digital & Analogue tracks and up to 300,000 components. Take the lead for your PCB designs before your competitors do.

"Performs up to professional standards. Most comprehensive available on any micro"
- BBC Acorn User February 1989.

RiscBASIC

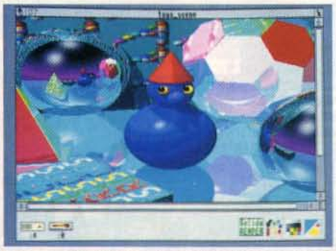


The best BASIC V compiler money can buy. Features include an optimising compiler, relocatable modules with multiple star commands, Window-based or command line compilation environment, standalone code generation, in-line assembler with powerful floating point mnemonic extensions and a Desktop developers environment from a leading Software House renowned for technical excellence.

"If you are looking for THE compiler to go for, and are confused about which one deserves to win the very public battle that has been raging in the advertisements, well my preference is for RiscBASIC"
- RISC USER August 1989.

"very useful indeed for development work...produced significantly more efficient code" - Micro User July 1989.

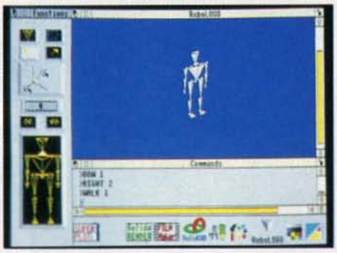
SolidsRENDER



The most advanced Ray Tracing package for the Archimedes producing photo-realistic images of designs taking into account multiple colour light sources, reflections, shadows, transparencies, refractions and textures for the highest quality pictures from the leading 3D graphics experts renowned for technical excellence. The high-speed ray tracer provides anti-aliasing for smooth edges, motion blur effects, and variable camera lens for wide angle and telephoto effects.

"SolidsRENDER offers the most comprehensive and advanced object properties ... the fastest ray-tracer ... outputting the highest quality images"
- A&B Computing November 1990.

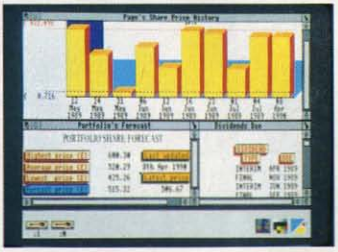
RoboLOGO



This new extension to traditional LOGO, provides three dimensional control of an articulated humanoid or animal figure based on the standard LOGO language. Natural commands such as 'Walking', 'Turning', 'Bowing', and 'Picking', etc are automatically represented graphically by natural movements of the 3D figure which is readily understood by students using LOGO as an introduction to computing. The traditional Turtlegraphics & 3D Glider features are also supported for students to further explore their school work.

"Takes turtlegraphics and LOGO programming into a new dimension. The things that the robot can do are only limited by imagination!" - Educational Computing April 1991.

ShareHolder



The complete share holder's management system providing all the facilities needed to automate your portfolio. Features include Company statistics, Share holdings, Transaction processing, Portfolio history, Forecasts, Dividends due, Share price updates plus built-in Calendar, Calculator and Hardcopy facilities for total integration.

"An excellent concept, the first professional share related package for the archimedes ... well thought through ... remarkably comprehensive."
- Archimedes World March 1991.

All RISC OS software run in native mode on all Archimedes Computers & BBC A3000 with 1 Mbytes.

SILICON VISION LTD, SIGNAL HOUSE, LYON ROAD, HARROW
MIDDLESEX HA1 2AG, UK. TEL: 081-861 2173
FAX: 081-427 5169. TELEX: 918266 SIGNAL G.

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Product Catalogue

For more details on these and other software products in our range please enquire for a free copy of Silicon Vision's 'Desktop Solutions' product catalogue.

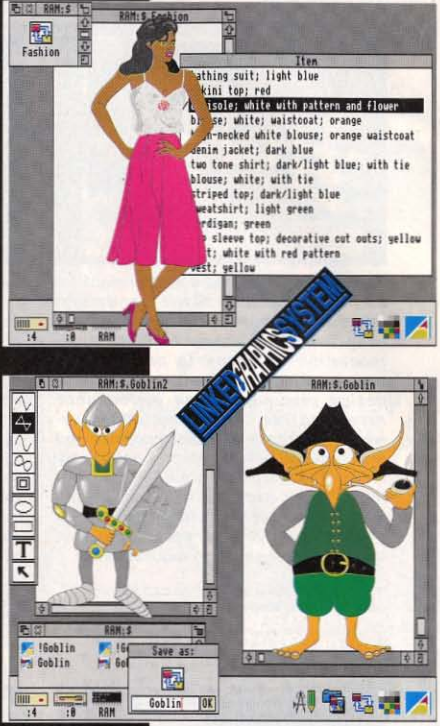
The smArt Suite

All 4Mation packages for the Archimedes carry a FREE SITE LICENCE.

SmArt is a Linked Graphics System. When picture files are loaded into smArt, different parts of the picture can be changed by making selections from a menu. The graphics components are automatically scaled so that the parts always fit. Pictures may be saved as Draw files or transferred to DTP programs or any other applications which can handle Draw files.

The smArt package comes with over two dozen files on subjects ranging from shops to cars, and churches to British Isles maps. Available as separate products are discs of smArt files on specific themes such as Leisure, Heraldry, Faces, Fashion, Homes, Trees & Gardens, and Dinosaurs.

smArt £55 (NZ$ 198)   smArt discs £16 (NZ$ 59)


RAM:$
Fashion
RAM:$.Fashion
Item
athing suit; light blue
kini top; red
isole; white with pattern and flower
bl se; white; waistcoat; orange
n-necked white blouse; orange waistcoat
enim jacket; dark blue
two tone shirt; dark/light blue; with tie
blouse; white; with tie
triped top; dark/light blue
eatshirt; light green
rdigan; green
sleeve top; decorative cut outs; yellow
t; white with red pattern
est; yellow
LINKED GRAPHICS SYSTEM
RAM:$.Goblin2
RAM:$.Goblin
RAM:$
!Goblin
Goblin
Save as:
Goblin
OK
RAM

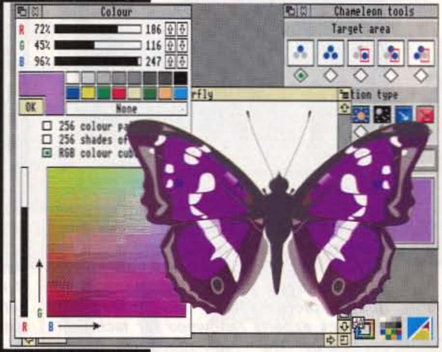
For those wishing to create their own smArt files, smArtFiler is an application which compiles smArt files from your source Draw files. Full instructions are provided along with lots of examples. Individual components may be scaled, rotated, and placed in front of or behind other components. Menu entries may be specified.

If it can be drawn it can be a smArt file.

smArtFiler £35 (NZ$ 129)

Chameleon is an ideal companion to smArt, and a must for anyone who needs to make quick and easy colour changes to Draw files. As well as palettes for 16 and 256 colour modes, there are options for 256 shades of grey and a RGB colour cube which provides thousands of colours. Colours may be selected from other Draw files so can be copied from one picture to another. Colours may also be changed in HSV values; Hue, Saturation and Value. Edited files may be saved as normal Draw files or as colour separations. A clever Undo and Redo facility allows virtually any number of colour changes to be cancelled and then reinstated. Zoom and Magnification facilities allow accurate editing of small areas.

Chameleon £25 (NZ$ 95)


Colour
R 72% 186
G 45% 116
B 96% 247
OK
None
☐ 256 colour pa
☐ 256 shades of
☒ RGB colour cub
Chameleon tools
Target area
rfly
tion type
R
G
B

FREE DEMO DISC

Send us a blank disc to receive a demo copy of smArt and Chameleon. Only the save facility is missing. Poster demo also available.

Poster	£89	NZ$367.50
Snippet	£29	NZ$120.00
Jigsaw	£29	NZ$120.00
Jiglet	£29	NZ$120.00
DTP Seeds*	£ 8.45	NZ$ 35.00

* (book - no VAT)

UK Prices: incl. P&P, excl. VAT @ 17½%.
NZ prices incl. GST.

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Fax. (03) 655-055

A world of colour

Steve Turnbull checks out two packages that use the same colour scanner

SCANNING is the process that takes a picture in the real world and produces a computer version. Mono-chrome scanners have been available for the Archimedes for some time now, but colour ones are only just beginning to appear.

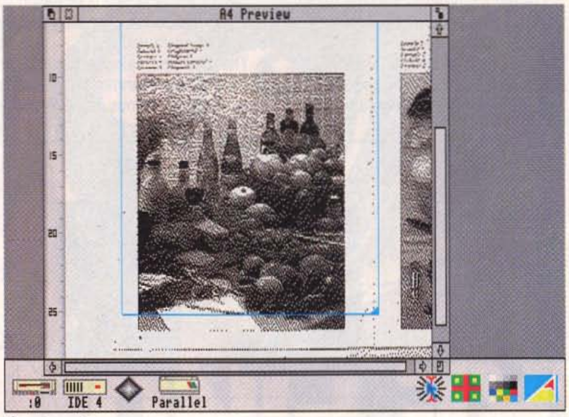
Most packages of this sort incorporate the actual scanning hardware, which has its own features and limitations, and the software that provides the control interface.

Here we're looking at two products, both of which use the Epson GT-4000 Colour Scanner – a separate panel shows the unit's hardware features.

Product: ArcScan
Price: £1799 plus VAT
Supplier: Clares Micro Supplies,
98 Middlewich Road, Rudheath,
Northwich, Cheshire CW9 7DA
Tel: 0606 48511
Requirements: Any Risc OS micro.

ArcScan arrived in a bit of a rush, being the pre-release version, and we only had the hardware for a couple of days. After an initial emergency – the expansion card had a bent pin which had to be carefully straightened – we got everything up and running.

With the scanner came the expansion card, which is just a bi-directional parallel port, and the software, !ArcScan and !Raw. The manual, in its finished form, comprised a couple of pages advising on installation. It assured readers that the program was easy and intuitive to use, and all the scanning features were described in the scanner manual.

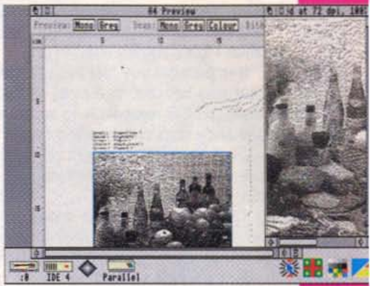


A previewed image

Having double-clicked the application then picked Select on its icon bar icon I would say that the software is fairly intuitive, but I would still prefer documentation in a form related to the package I'm using. Not only that, but, contrary to what the manual implies, not all the scanner's facilities are available to you. For example, while the scanner allows you to omit red, green or blue from the final image, the ArcScan software does not.

The main window has rules down the side and buttons on its pane for ease of use. Unfortunately the buttons scroll off the screen if you choose to scan the bottom area – not so easy.

In the end I forgot about the buttons and just used the menu system. The procedure when scanning is to do a fast preview, probably monochrome, of the whole image and then put a box around the portion you require.

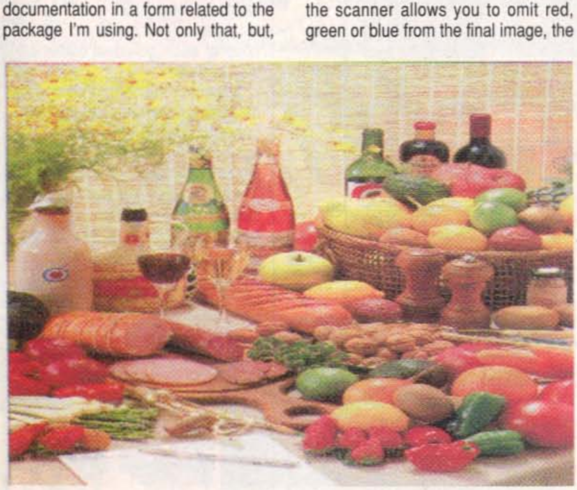


The scan window

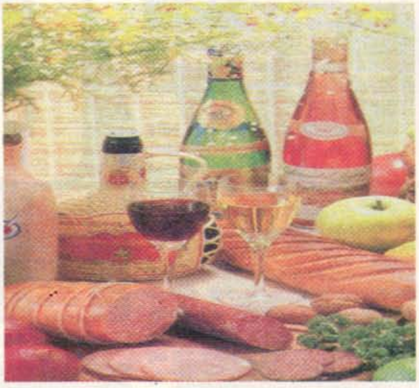
It all went smoothly until I decided to change the dots per inch scanning resolution: My carefully aligned box moved. In fact its coordinates changed in proportion to the change in dpi – doubling the dpi halved the measurements.

This is very sloppy and ought to have been picked up early on. My discussions with Clares didn't give the impression that they were going to change this.

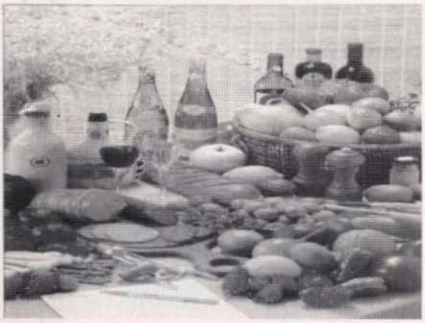
Altering the dpi itself is not very ➤



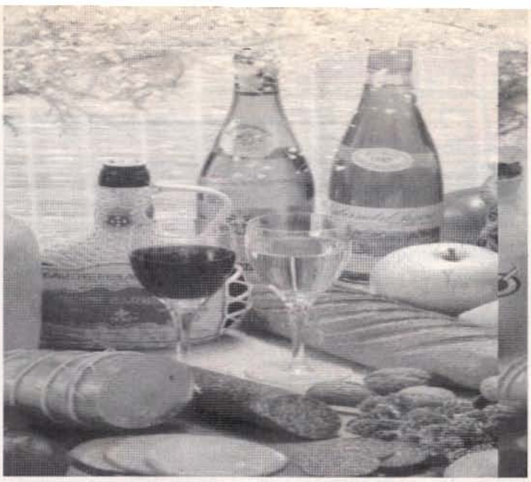
A colour scan at 100 dpi...



... the same picture at 400 dpi



A monochrome image at 100 dpi...



... the same one at 400dpi

easy. You have to enter a submenu and alter the value from the keyboard, which I found aggravating.

It is perhaps true that the average user may not change the dpi all that often, but it is reasonable to suppose that at the start of a scanning session you will want to experiment with various settings before committing yourself.

The package holds the image currently being scanned in the main memory, which means that even with a 4Mb machine you will not be doing big full colour scans.

The scanned image can be saved as a sprite, with the colours dithered if you prefer, or as raw RGB data, which does not lose any of scanned data but can't be displayed on screen.

The !Raw utility is supplied to allow you to convert raw data into final sprite images.

However, the biggest advantage of the Clares' software is that it's possible to use it without the additional podule – you can use the serial link and so avoid taking up another slot in your machine.

Product: Scan
Price: £1299.00 (600dpi £1699.00)
Supplier: DT Software, Freepost,
Cambridge CB5 7BR
Tel: 0223 814099
Requirements: Any Risc OS micro.

The DT Software package was even less finished in some ways, the manual was still an Impression file on the disc and two applications that would be provided with the finished versions were not available.

However, the software was very easy to use. The main window contains the preview image and the scan box measurements, while a second window, available from Options on the icon bar menu, controls all other facilities.

This software puts the finished scans directly on to the disc – you'll need 45Mb free for a full size 24 bit colour scan – and performs conversion to sprite or Clear file formats on the fly. In fact it chooses the format depending on the number of bits per pixel you have chosen. As long as there's no data loss it chooses Sprite, but from five to eight bpp it selects Clear instead.

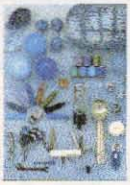
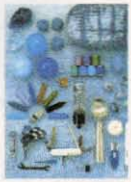
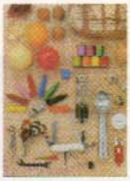
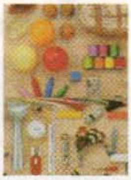
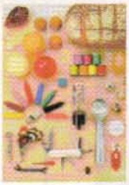
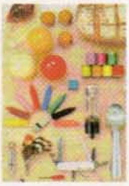
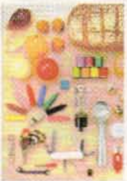
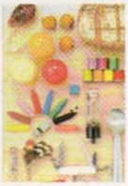
Clear format is the generally accepted 24 bit colour standard for Risc OS machines since Acorn have not provided one.

Software is available in the public domain to convert Clear into Sprite and the more general formats of GIF and TIFF – if that's what you need.

When you request a scan a Save dialogue box pops up and this is dragged to the disc you want to save on. The program then performs the scan.

A background option is promised so that you can continue working while a scan is being carried out.

The Options dialogue box makes control of the scanner much easier than using the menus in the ArcScan software. And the ability to control the bits per pixel directly means a whole panorama of options become available.

bpp	50dpi	100dpi
1		
2		
3		
4		

Using the DT scanner you can alter the number of bits per pixel that is provided to create the sprite

Summing up

In terms of finished output there's not much to choose between the two packages. You might need !Translatr to process DT's higher resolution images, but that's easy to get hold of and the Clear format will allow you to take full 24 bit colour scans across to other types of machine.

All things considered ,the DT Software package is the better buy.

Epson GT-4000

THIS piece of hardware provides an excellent cost/resolution ratio and has extensive capabilities, one of which is to drive certain printers directly, not that we're much interested in that.

It can produce 256 grey scale images, or apply built-in half-toning for 1bpp and 2bpp scans. Up to 8bpp of each individual colour are also available.

Scanning resolution comes in 16 settings between 50 and 400 dpi. But there's a special zoom option so you can get a larger image of the thing your scanning.

Additional built-in functions include standard colour correction facilities for specific types of printer or monitor.

The unit itself is the size of a printer and can accept images up to 214mm by 295mm.

Along with the 172 page manual – which is extremely well written and merits a good read – is a small booklet with sample pictures – used here – which show the different effects that can be obtained using the machines options. Very useful.

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fun school 2
For 6-8 year olds
DATABASE EDUCATIONAL SOFTWARE

DATABASE
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SOFTWARE

FOR DETAILS OF PRICES, FORMATS, AND HOW TO ORDER, TURN TO PAGE 136.

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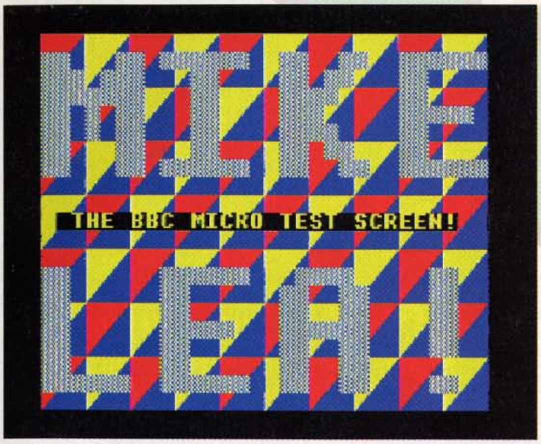
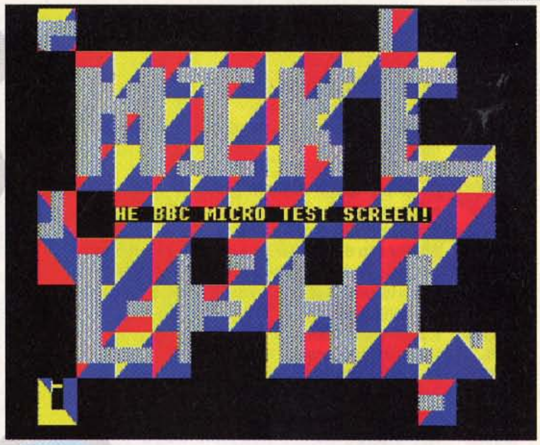
TO ORDER, PLEASE USE THE FORM ON PAGE 136





All cut up

Mike Goldberg is in pieces over his great new game

EVER wondered what you could actually do with all those screens you saved and have stashed away on endless discs? Well now they can all be made into jigsaws divided into pieces, up to 70 for each.

The program given here will display the middle portion of a Mode 1 saved screen in a window described by:

```
VDU24,160;224;1116;892;
```

If, like mine, most of your saved screens are in Mode 2 convert them, as I did, using the excellent listing by Ivan Sayer from the September 1991 issue of *The Micro User*. Type in Listing I and run it. This generates a file called JigCode which must be loaded before the main program.

Now enter Listing II, use the checksums to ensure you've made no typing errors and save it. To make your own jigsaws simply type:

```
PAGE=&1100:
*LOAD JIGCODE
CHAIN "JIGSAW"
```

and follow the screen options. Just tell the micro the name of your saved screen and it'll load it in. Then you superimpose a jigsaw grid over the picture if you wish – looks good but makes the puzzle harder. After that it's up to you how many pieces (1-70) you want to split your masterpiece into.

Finally you've a last chance to look at the complete picture before you let the micro scramble it. Some pieces will be rotated as well as moved.

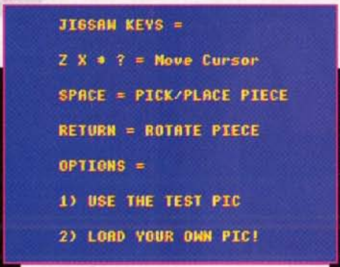
To put it back together again use the following keys:

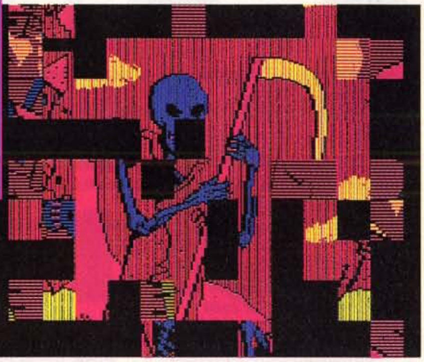
Z, X, *, ?	Move cursor or piece
Space	Pick or place piece
Return	Rotate piece

Place the cursor over the piece you want to rotate and press Return – it will turn clockwise through 90 degrees each time. To move a piece, place the cursor over it and press Space and you'll hear a beep which means that the cursor has now turned into that jigsaw piece.

Move the piece to where you want to place it and press Space again. A beep will signal that this piece has been dropped and that the cursor is itself once more.

You cannot place one piece over another as it would cause confusion and there's enough of that about as it is.


```
JIGSAW KEYS =
Z X * ? = Move Cursor
SPACE = PICK/PLACE PIECE
RETURN = ROTATE PIECE
OPTIONS =
1) USE THE TEST PIC
2) LOAD YOUR OWN PIC!
```



VARIABLES

CX%	Place to draw cursor/piece
CM%	Memory address of piece
Y%(U%)	Screen address positions of all possible places a piece may go
U%	Data for y%( )
y%(107)	=0 Empty space so place piece, =1 space is occupied so piece can't be placed
X%(69)	The 70 positions of the jigsaw pieces
M%	Address to dump new data of piece being rotated
P%	Address to dump new data of piece being moved
newX%	Place where piece is physically rotated off screen
t%	=0 nothing picked up; =1 piece picked up
Q%,R%	Random positioning of V% pieces
UD%	Up/down displacement.
LR%	Left/Right displacement.
rot%	Address of rotate piece routine.
draw%	Address of draw piece routine.
replace%	Address of replace rotated piece routine.
and%	Address to AND the funny shaped outlines to make it look like it's a proper jigsaw and irritate the user

MAIN PROCEDURES

init	Initialise variables
draw(x,x)	Draw pieces
rot	Rotate image
rot2	Rotate image
keys	Look for key presses
M	Move Cursor/Piece
take	Pick up a piece
drop	Drop a piece
init2	Read initial values of the position of pieces
rnd	Break up jigsaw randomly
pieces	Draw the jigsaw-shaped and pieces over the picture
windows	Square off picture into usable area
pics	Menu
test	Draw test picture
load	Load your own picture

MEMORY

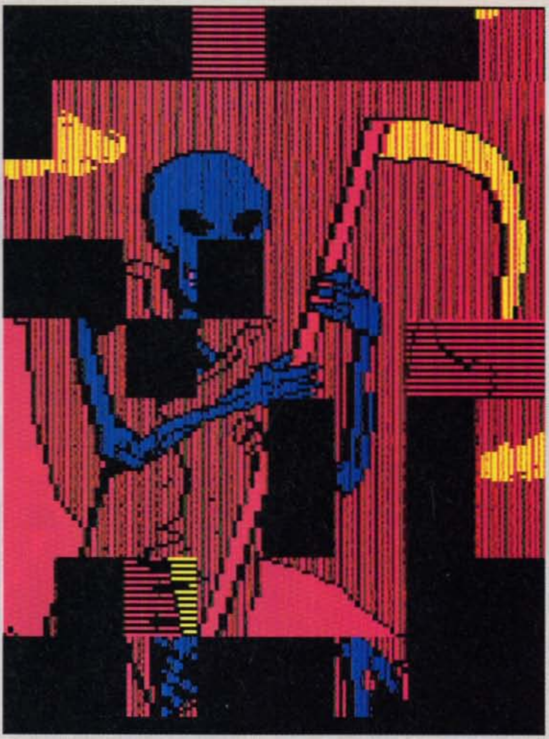
&2840-&2BA0	The six jigsaw shaped pieces
&2BA0-&2BE0	AND code for ANDing above
&2BE0-&2C70	Empty as it's used as an area to dump data of a rotating piece
&2C70-&2D00	Empty as it's used as an area to dump data of a piece being MOVED
&2D00-&2D90	Cursor numbers
&2D90-&2DC0	Replace code
&2DC0-&2DD0	Eor code
&2DD0-&2E00	Draw code
&2E00-&2F20	Rotate code

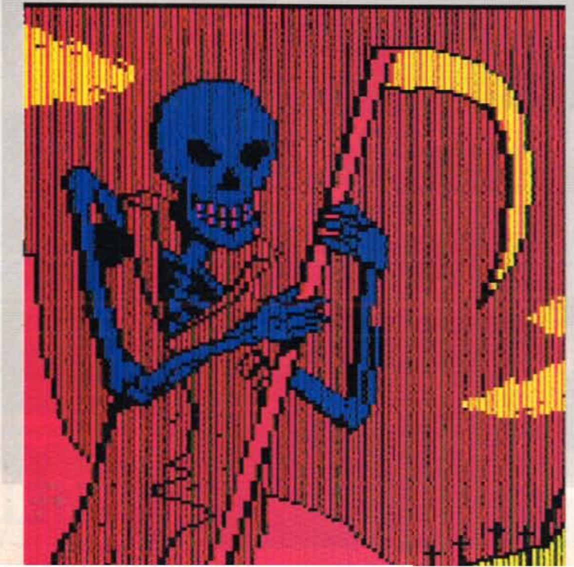
```
  10 REM JigGen
  20 REM by Mike Goldberg
  30 REM (c) The Micro User
  40 :
  50 P%=&2840:HIMEM=P%
  60 i$=""
  70 REPEAT
  80 I%=FNnext
  90 IF I%=0 PROCmany ELSE PROCone
 100 UNTIL I%=-1
 110 *SAVE JigCode 2840 2F20
 120 END
 130 :
 140 DEFPROCmany
 150 I%=FNnext:J%=FNnext
 160 FOR L%=1 TO I%
 170 ?P%=J%:P%=P%+1:NEXT
 180 ENDPROC
 190 :
 200 DEFPROCone:?P%=I%:P%=P%+1:ENDPROC
 210 :
 220 DEFFNnext
 230 IF i$="" READ i$:VDUASC"."
 240 c$=LEFT$(i$,2)
 250 i$=MID$(i$,3)
 260 IF c$="XX" =-1 ELSE =EVAL("&"+c$)
 270 DATA0001000007770001000007FF330003
 280 DATADD0003BB0002CC0003BB0003DD3300
 290 DATA01000007FF0001000007FF00027700
 300 DATA04FF0002770028FF0008770028FF00
 310 DATA0100000777000100007FF00010000
 320 DATA07FF0001000007FF0001000007FF00
 330 DATA01000007FF0002770004FF00027700
 340 DATA28FF0008770008FFCC0003BB0003DD
 350 DATABB330003DD0003BBDD0010FF000100
 360 DATA000777000100007FF330007FFCC00
 370 DATA07FF0001000007FF0001000007FF00
 380 DATA0277880002FF88000277FF110004EE
 390 DATA110021FF0008770028FF0001000007
 400 DATA770001000007FF330007FFCC0007FF
 410 DATA0001000007FF0001000007FF000877
 420 DATA0019FF88000477880002FFEE110002
 430 DATAFF11EEFF0008770028FF0001000007
 440 DATA770001000007FF330003DD0003BB00
 450 DATA02CC0003BB0003DD330001000007FF
 460 DATA0001000007FF0002770004FF000277
 470 DATA0028FF0008770008FFCC0003BB0003
 480 DATADDBB330003DD0003BBDD0010FF0001
 490 DATA000007770001000007FF330007FFCC
 500 DATA0007FF0001000007FF0001000007FF
 510 DATA000277880002FF88000277FF110004
 520 DATAEE110012FF88000477880002FFEE11
 530 DATA0002FF11EEFF0008770028FFA90385
 540 DATA74A0000100A230B1708576B1722576
 550 DATA9170C8CAD0F2A5701869808570A571
 560 DATA69028571A5721869308572A5736900
 570 DATA01008573C6740002D060000BFF0010
 580 DATA0FF5FAF5FAF5FAF5FAF5FAF5FAF5FA
 590 DATAF5FAF5FAF5FAF5FAF5FAF5FAF5FAF5
 600 DATAFAF5FA00100FF5FAF5FAF5FAF5FAF5
 610 DATAFAF5FAF5FAF5FAF5FAF5FAF5FAF5FA
 620 DATAF5FAF5FAF5FAF5FA00050F1F3F7F0F
 630 DATA1F3F7F0004FFF5FAF5FAF5FAF5FAF5
 640 DATAFAF5FAF5FAF5FAF5FAF5FAF5FAF5FA
 650 DATAF5FAF5FAF5FAF5FAF5FAF5FAF5FAF5
 660 DATAFAF5FAF5FAF5FAF5FAF5FAF5FAF5FA
 670 DATAF5FAF5FAF5FAF5FAF5FA00050F1F3F
 680 DATA7F0F1F3F7F0004FFF5FAF5FAF5FAF5
 690 DATAFAF5FAF5FAF5FAF5FAF5FAF5FAF5FA
 700 DATAF5FAF5FAF5FAF5FAF5FAF5FAF5FAF5
 710 DATAFAF5FAF5FAF5FAF5FAF5FA00050F1F
 720 DATA3F7F0F1F3F7F0024FFF00003800024
 730 DATA00F00003100038000000380F0002400
 740 DATA000310F0A9038576A0000100A230B1
 750 DATA709172C8CAD0F8A5701869808570A5
 760 DATA7169028571A5721869308572A57369
 770 DATA0001008573C676D0D660000100A903
 780 DATA8574A0000100A230B1708576B17245
 790 DATA769170C8CAD0F2A5701869808570A5
 800 DATA7169028571A5721869308572A57369
 810 DATA0001008573C6740002D06018693085
 820 DATA72A5736900010008573A9038578A903
 830 DATA8577A9028576A9028575A9048574A0
 840 DATA000100A9808582A9088583A9018580
 850 DATAA9108581A20420D62E20EA2E20FE2E
 860 DATAA5701869018570A571690001008571
 870 DATA06800681CAD0E320B72EC674D0D2A5
 880 DATA701869088570A571690001008571C6
 890 DATA75D0B3209C2EC676D0A8208E2EC677
 900 DATAD09D20732EC678D09260A57038E970
 910 DATA8570A571E9078571A5721869B08572
 920 DATAA5736902857360A5701869788570A5
 930 DATA716902857160A57038E90C8570A571
 940 DATAE90001008571A57238E9108572A573
 950 DATAE90001008573 60A5721869018572A5
 960 DATA7369000100857366826683A57038E9
 970 DATA048570A571E9000100857160B17025
 980 DATA82D00DB1702583F007B17218658091
 990 DATA7260B1702583D00DB1702582F007B1
1000 DATA72186581917260B1702583F010B170
1010 DATA2582F00AB172186580186581917260
1020 DATA000B00XX
```

Get it right ✓

```
  10 =    0 0       520 = 9D2D 4
  20 =    0 0       530 = 4B60 8
  30 =    0 0       540 = 3167 2
  40 = 9719 9       550 = B3EC 4
  50 = EBA7 6       560 = E5A9 0
  60 = AF4F 1       570 = 7B3D 0
  70 = BFBA F       580 = 3F87 E
  80 = 4ED5 1       590 = DA2F 4
  90 = C15E B       600 = 95CB 0
 100 = 13B9 2       610 = 3E86 0
 110 = 179B D       620 = 6838 0
 120 = FD2E 1       630 = 2FC8 3
 130 = 9719 2       640 = 3E86 8
 140 = 9AB6 8       650 = DA2F F
 150 = CFCF B       660 = 3E86 6
 160 = 1FB5 1       670 = 6004 3
 170 =  3F0 A       680 = 4524 F
 180 = ED0F 8       690 = 3E86 6
 190 = 9719 2       700 = DA2F C
 200 = 95EB 4       710 = 2E86 5
 210 = 9719 4       720 = E2FF 4
 220 = 7D65 E       730 = DFA8 F
 230 = FC1B 8       740 = D77B 8
 240 = C5D7 4       750 = 63FF 2
 250 = 5CDE 3       760 = E6E4 D
 260 = 173F 1       770 = 34D8 F
 270 = C9E3 2       780 = 5356 9
 280 = 3BD5 6       790 = 4C55 0
 290 = 684A B       800 = E6E4 6
 300 = CCF3 B       810 = 94F3 2
 310 = 70BA 4       820 =  EC2 2
 320 = 469E E       830 = FEC7 3
 330 = 319E F       840 = F17A 8
 340 = 7746 0       850 = 97A5 4
 350 = AA0B 4       860 = 42DC C
 360 = B695 7       870 = 2D90 7
 370 = 469E 0       880 = 62FE 4
 380 = 2E58 4       890 = 3BF0 0
 390 = D750 F       900 =  95D 0
 400 = 698C 0       910 = 7988 1
 410 = E3C4 9       920 = 6B85 1
 420 = AFBC 9       930 = 5241 B
 430 = 241D 1       940 = 9389 7
 440 = CA25 0       950 = 9D30 9
 450 = ED99 3       960 = 51C6 A
 460 = 506A 4       970 = A9ED 9
 470 = 5E14 8       980 = DC6B 2
 480 = F75A 9       990 = 232B 8
 490 = 2DA8 8      1000 = 423C 3
 500 = CE08 F      1010 = 4E06 D
 510 = B3FA 3      1020 = D614 4
```

```
   10 REM JIGSAW
   20 REM by Mike Goldberg
   30 REM The Micro User
   40 MODE1
   50 VDU23;8202;0;0;0;
   60 VDU19,3,4;0;:REM OPTIONAL COLOUR
   70 VDU23;6,28;0;0;0;
   80 DIMX%(69),Y%(107),y%(107)
   90 PROCinit
  100 PROCinit2
  110 PROCpics
  120 PROCwindows
  130 PRINTTAB(0,0)"JIGsawed or not? Y/N
"
  140 q$=GET$
  150 IFq$<>"Y"GOTO210
  160 PROCpieces
  170 GCOL0,0
  180 MOVE160,224
  190 PLOT1,0,668
  200 PLOT1,960,0
  210 PRINTTAB(0,0)"How many pieces to
split (1-70)";
  220 INPUTnop%:IFnop%<1ORnop%>70GOTO210
  230 PRINTTAB(0,0)SPC39
  240 PRINTTAB(0,0)"PRESS SPACE TO SCRAM
BLE!":REPEATUNTILGET=32
  250 PROCrnd
  260 SOUND1,-13,90,2
  270 PRINTTAB(0,0)SPC39
  280 PROCdraw(CX%,CM%)
  290 :
  300 REPEAT
  310 PROCkeys
  320 UNTIL0
  330 :
  340 END
  350 :
  360 DEFPROCinit
  370 VDU23,255,-1;-1;-1;-1;
  380 VDU23,224,170,85,170,85,170,85,170
,85
  390 U%=0
  400 t%=0
  410 rot%=&2E00
  420 draw%=&2DC0
  430 replace%=&2D90
  440 and%=&2BA0
  450 X%=&3A50
  460 M%=&2BE0
  470 newX%=&7680
  480 CM%=&2D00
  490 CX%=X%
  500 CX%=&32A0
  510 LR%=&30
  520 UD%=1920
  530 ENDPROC
  540 :
  550 DEFPROCdraw(x%,m%)
  560 !&70=x%:!&72=m%:CALLdraw%
  570 ENDPROC
  580 :
  590 DEFPROCrot(x%,nx%)
  600 IFt%=1ENDPROC
  610 PROCdraw(CX%,CM%)
  620 !&70=x%:!&72=nx%:CALLrot%
  630 !&70=x%:!&72=M%:CALLreplace%
  640 PROCdraw(CX%,M%)
  650 !&70=newX%-&28:!&72=M%:CALLreplace
%
  660 PROCdraw(CX%,M%)
  670 PROCdraw(newX%-&28,M%)
  680 PROCdraw(CX%,CM%)
  690 ENDPROC
  700 :
  710 DEFPROCkeys
  720 IFINKEY-52ORINKEY-74PROCrot(CX%,ne
wX%)
  730 IFINKEY-98PROCM(-LR%,-1)
  740 IFINKEY-67PROCM(LR%,1)
  750 IFINKEY-73PROCM(-UD%,-12)
  760 IFINKEY-105PROCM(UD%,12)
  770 IFINKEY-99ANDt%=0ANDy%(U%)=1PROCta
ke:t%=1:ENDPROC
  780 IFINKEY-99ANDt%=1PROCdrop:ENDPROC
  790 ENDPROC
  800 :
  810 DEFPROCM(cx%,u%)
  820 IFU%+u%<0ORU%+u%>107ENDPROC
  830 IFu%=1IF(U%+u%)MOD12=0ENDPROC
  840 IFu%=-1IF(U%+u%)MOD12=11ENDPROC
  850 U%=U%+u%
  860 PROCdraw(CX%,CM%)
  870 CX%=CX%+cx%
  880 PROCdraw(CX%,CM%)
  890 FORT=1TO150:NEXT
  900 ENDPROC
  910 :
  920 DEFPROCtake
  930 y%(U%)=0
  940 PROCdraw(CX%,CM%)
  950 CM%=&2C00
  960 !&70=CX%:!&72=CM%:CALLreplace%
  970 SOUND1,-13,200,1
  980 TIME=0:REPEATUNTILTIME>30
  990 ENDPROC
 1000 :
 1010 DEFPROCdrop
 1020 IFy%(U%)=1SOUND1,-13,0,2:ENDPROC
 1030 !&70=CX%:!&72=&2C70:CALLreplace%
 1040 CM%=&2D00
 1050 SOUND1,-13,20,1
 1060 TIME=0:REPEATUNTILTIME>30
 1070 PROCdraw(CX%,CM%)
 1080 y%(U%)=1
 1090 t%=0
 1100 ENDPROC
 1110 :
 1120 DEFPROCinit2
 1130 FORI%=0TO107:y%(I%)=0:NEXT
 1140 Z%=-1
 1150 z%=0
 1160 FORJ%=0TO8
 1170 FORI%=0TO11
 1180 Z%=Z%+1
 1190 Y%(Z%)=&32A0+(I%*&30)+(J%*1920)
 1200 IFI%>0ANDI%<11ANDJ%>0ANDJ%<8y%(Z%)
=1
 1210 NEXT
 1220 NEXT
 1230 Z%=-1
 1240 FORJ%=0TO6
 1250 FORI%=0TO9
 1260 Z%=Z%+1
 1270 X%(Z%)=&3A50+(I%*&30)+(J%*1920)
 1280 NEXT
 1290 NEXT
 1300 ENDPROC
 1310 :
 1320 DEFPROCrnd
 1330 C%=0
 1340 REPEAT
 1350 REPEATR%=RND(70)-1:UNTILX%(R%)>1
 1360 Q%=R%:q%=R%DIV10:q%=q%*2:Q%=Q%+13+
q%
 1370 y%(Q%)=0
 1380 C%=C%+1
 1390 V%=RND(4)-1:IFV%=0GOTO1430
 1400 FORT%=1TOV%
 1410 PROCrot2
 1420 NEXT
 1430 P%=&2C70
 1440 !&70=X%(R%):!&72=P%:CALLreplace%
 1450 PROCdraw(X%(R%),P%)
 1460 X%(R%)=1
 1470 REPEATr%=RND(108)-1:UNTILy%(r%)=0
 1480 PROCdraw(Y%(r%),P%)
 1490 y%(r%)=1
 1500 UNTILC%=nop%
 1510 ENDPROC
 1520 :
 1530 DEFPROCrot2
 1540 !&70=X%(R%):!&72=newX%:CALLrot%
 1550 !&70=X%(R%):!&72=M%:CALLreplace%
 1560 PROCdraw(X%(R%),M%)
 1570 !&70=newX%-&28:!&72=M%:CALLreplace
%
 1580 PROCdraw(X%(R%),M%)
 1590 PROCdraw(newX%-&28,M%)
 1600 ENDPROC
 1610 :
 1620 DEFPROCpieces
 1630 Z%=0
 1640 FORJ%=0TO6
 1650 FORI%=0TO9
 1660 A%=X%+(I%*&30)+(J%*1920)
 1670 IFZ%=0ANDI%>0ANDI%<9PROCand(A%,&2B
10)
 1680 IFZ%=0ANDI%=0AND(J%MOD2)=0PROCand(
A%,&29F0)
 1690 IFZ%=0ANDI%=9AND(J%MOD2)=1PROCand(
A%,&2960)
 1700 IFZ%=1ANDJ%>0ANDJ%<6PROCand(A%,&2A
80)
```





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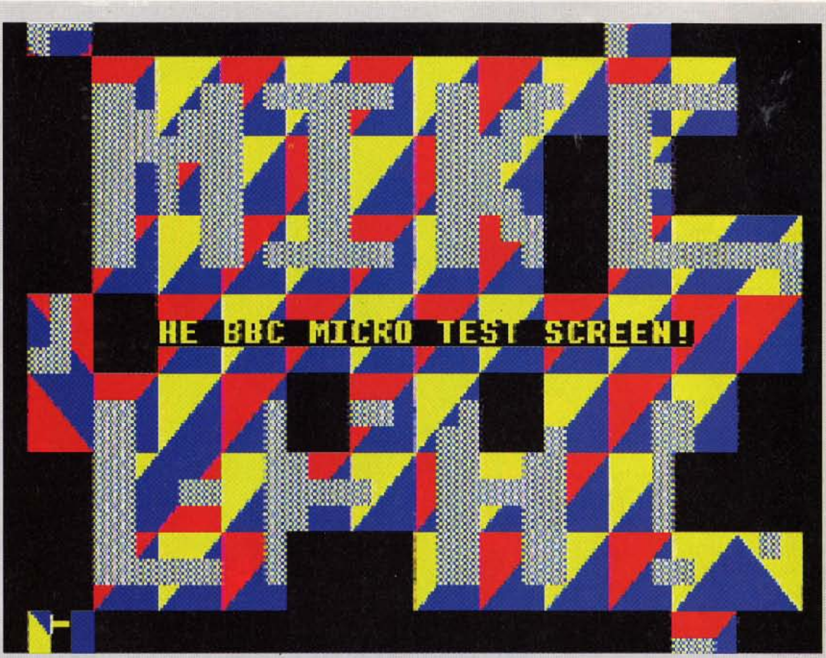
```
1710 IFZ%=1ANDJ%=0PROCand(A%,&28D0)
1720 IFZ%=1ANDJ%=6PROCand(A%,&2840)
1730 Z%=(Z%+1)MOD2
1740 NEXT
1750 Z%=(Z%+1)MOD2
1760 NEXT
1770 ENDPROC
1780 :
1790 DEFPROCand(x%,m%)
1800 !&70=x%:!&72=m%:CALLand%
1810 ENDPROC
1820 :
1830 DEFPROCwindows
1840 VDU24,0;0;156;1020;
1850 GCOL0,128:CLG
1860 VDU24,0;0;1276;220;
1870 CLG
1880 VDU24,0;896;1276;1020;
1890 CLG
1900 VDU24,1120;0;1276;1020;
1910 CLG
1920 VDU26
1930 ENDPROC
1940 :
1950 DEFPROCpics:LOCALX%,Y%
1960 *FX15
1970 COLOUR131:CLS
1980 VDU5
1990 X%=256:Y%=864
2000 RESTORE2140
2010 REPEAT
2020 READw$
2030 GCOL0,1
2040 MOVEX%,Y%:PRINTw$
2050 GCOL0,2:MOVEX%+4,Y%+4:PRINTw$
2060 Y%=Y%-96
2070 UNTILw$=" "
2080 COLOUR128
2090 VDU4,26
2100 G=GET-48:IFG<1 OR G>2GOTO2100
2110 IFG=1PROCtest
2120 IFG=2PROCload
2130 ENDPROC
2140 DATAJIGSAW KEYS =,Z X * ? = Move C
ursor,SPACE = PICK/PLACE PIECE,RETURN =
ROTATE PIECE,OPTIONS =,1) USE THE TEST P
IC,2) LOAD YOUR OWN PIC!
2150 DATA" "
2160 :
2170 DEFPROCload
2180 LOCALX%,Y%
2190 CLS
2200 PRINT"What is the name of your sav
ed screen?"
2210 INPUTname$
2220 $&700="LOAD "+name$+" 3000"
2230 Y%=7:CALL&FFF7
2240 ENDPROC
2250 :
2260 DEFPROCtest:COLOUR128:CLS
2280 LOCALZ%,a%,b%
2290 Z%=1
2300 FORJ%=892TO256STEP-96
2310 FORI%=160TO1024STEP96
2320 GCOL0,Z%
2330 MOVEI%,J%:PLOT1,96,0:PLOT81,-96,-9
6:GCOL0,3:PLOT81,96,0
2340 Z%=Z%MOD2+1
2350 NEXT
2360 Z%=Z%MOD2+1
2370 NEXT
2380 RESTORE2560:add=0
2390 VDU26
2400 FORT=1TO2
2410 READw$:VDU5:GCOL0,0:MOVE32,992:VDU
255,255,255,255:GCOL0,1:MOVE32,992:PRINT
w$:VDU4
2420 a%=4:b%=5+add
```



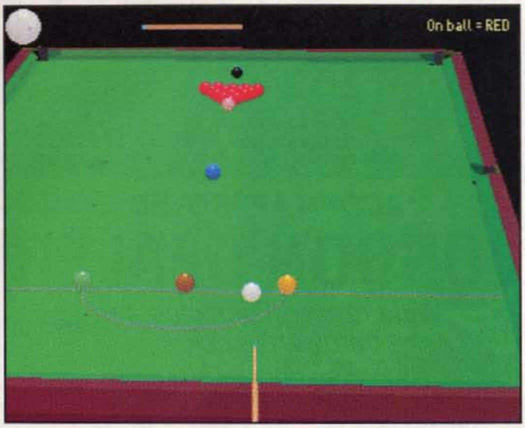
```
2430 COLOUR2:COLOUR131
2440 FORJ%=32TO160STEP4
2450 FORI%=992TO960STEP-4
2460 IFPOINT(J%,I%)=1PRINTTAB(a%,b%)CHR
$224
2470 b%=b%+1
2480 NEXT
2490 a%=a%+1:b%=5+add
2500 NEXT
2510 add=add+12
2520 NEXT
2530 COLOUR128:COLOUR2:PRINTTAB(6,14)"
THE BBC MICRO TEST SCREEN!"
2540 COLOUR1:COLOUR128
2550 ENDPROC
2560 DATAMIKE,LEA!
```

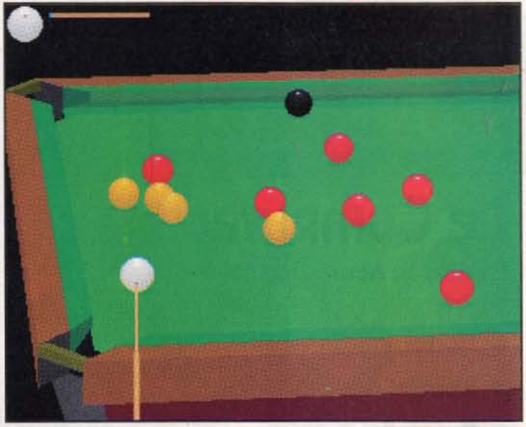
Get it right ✓

```
  10 =    0 0
  20 =    0 0
  30 =    0 0
  40 = EA3A A
  50 = F716 4
  60 = F1C0 A
  70 = 5E15 B
  80 = B6B0 4
  90 = DEBB A
 100 = 87A2 D
 110 = 2CD7 E
 120 = 65C3 5
 130 = A953 1
 140 = 5B1B 5
 150 = A9F2 6
 160 = 26C0 B
 170 = 130E 3
 180 = E878 2
 190 = 8975 9
 200 = 8D15 0
 210 = F93E F
 220 = A53F 0
 230 = 6E71 2
 240 = 5E7A 7
 250 = C04A B
 260 = F885 8
 270 = 6E71 9
 280 =  E07 3
 290 = 9719 E
 300 = BFBA 0
 310 = B0B6 B
 320 = 53CE E
 330 = 9719 A
 340 = FD2E 5
 350 = 9719 D
 360 = 344C D
 370 = 70B7 C
 380 = 1469 4
 390 = E1D2 A
 400 = A028 0
 410 = 69AE C
 420 =  77E E
 430 = 26CD B
 440 = 2498 6
 450 = 378A 8
 460 = 653D D
 470 = F87D 1
 480 = 52AC 0
 490 = 4CC1 D
 500 =   D2 9
 510 = 182C C
 520 = 90A0 9
 530 = ED0F A
 540 = 9719 C
 550 = 3322 B
 560 = 401C 9
 570 = ED0F 1
 580 = 9719 7
 590 = EA89 9
 600 =   AD 2
 610 =  E07 D
 620 = E9FE 3
 630 = F79C F
 640 = 986C 9
 650 = EC79 C
 660 = 986C 1
 670 = 3CC5 5
 680 =  E07 4
 690 = ED0F 6
 700 = 9719 0
 710 = 5A41 E
 720 =  C82 2
 730 = D973 C
 740 =  630 D
 750 = 9586 D
 760 = 1D89 C
 770 =  D4F 4
 780 = 7423 A
 790 = ED0F 9
 800 = 9719 0
 810 = 3DDC F
 820 = 4CC9 E
 830 = B14B 5
 840 = 9C35 E
 850 = BD76 6
 860 =  E07 7
 870 = 1D66 F
 880 =  E07 E
 890 = BCF5 2
 900 = ED0F E
 910 = 9719 E
 920 = 5E2E 1
 930 = 26BD 1
 940 =  E07 C
 950 = D73C A
 960 = 7C61 7
 970 = 37E4 6
 980 = EF58 0
 990 = ED0F B
1000 = 9719 C
1010 = D1EA E
1020 = 7F0B A
1030 =  6D7 2
1040 = 52AC F
1050 = D6F9 8
1060 = EF58 2
1070 =  E07 3
1080 = 369C 7
1090 = A028 B
1100 = ED0F 0
1110 = 9719 5
1120 = 2CC6 B
1130 = D8E8 D
1140 =  9AB 2
1150 =  272 B
1160 = F7A5 5
1170 = 7E90 7
1180 = CE8C 8
1190 = 5F6D 7
1200 = F768 C
1210 = 2C83 5
1220 = 2C83 8
1230 =  9AB 3
1240 = 166B D
1250 = 2964 8
1260 = CE8C E
1270 = 9A26 E
1280 = 2C83 6
1290 = 2C83 9
1300 = ED0F 0
1310 = 9719 E
1320 = D6D2 9
1330 = DDEC 0
1340 = BFBA F
1350 = 9141 F
1360 = AE4C 1
1370 = AFBB 1
1380 = 3AEB 8
1390 = 555F 1
1400 = 155D E
1410 = B11E 6
1420 = 2C83 3
1430 = 57E6 1
1440 = 8864 1
1450 = 920A 7
1460 = 6DF3 0
1470 = C2F3 7
1480 = 93B9 2
1490 = 59FC 7
1500 = 7556 B
1510 = ED0F E
1520 = 9719 B
1530 = 5BE9 D
1540 = A2F0 9
1550 = AA3D C
1560 = 9338 C
1570 = EC79 F
1580 = 9338 9
1590 = 3CC5 0
1600 = ED0F 4
1610 = 9719 8
1620 = 4641 B
1630 = 353C 3
1640 = 166B B
1650 = 2964 8
1660 = 7D32 C
1670 =  460 F
1680 = E322 5
1690 =  AEC E
1700 = B424 2
1710 = 54D1 7
1720 = 5AB2 8
1730 = B660 4
1740 = 2C83 D
1750 = B660 5
1760 = 2C83 5
1770 = ED0F 2
1780 = 9719 2
1790 = 999E 3
1800 = BF96 4
1810 = ED0F 9
1820 = 9719 1
1830 = 8865 6
1840 = D452 D
1850 = 1CC7 6
1860 = 4EAE 4
1870 = 6A37 F
1880 = C119 D
1890 = 6A37 B
1900 = A328 D
1910 = 6A37 7
1920 = B962 4
1930 = ED0F 3
1940 = 9719 B
1950 = EA92 7
1960 = A022 0
1970 = 2149 B
1980 = 667A B
1990 = DCE9 F
2000 = FF4F 7
2010 = BFBA 2
2020 = 4F2A B
2030 =  32F 6
2040 = 1453 3
2050 = 950D F
2060 = FFB9 1
2070 = 36F2 6
2080 = A76B E
2090 = 7E28 8
2100 =  34D B
2110 = FE8C 1
2120 = 1EE9 9
2130 = ED0F 5
2140 = FDD0 0
2150 =  D51 8
2160 = 9719 2
2170 = 24A1 9
2180 = A269 5
2190 = 7A16 2
2200 = 33EB 5
2210 = 366B 1
2220 =  7CB 9
2230 = FAD6 1
2240 = ED0F F
2250 = 9719 3
2260 = A348 0
2280 =  903 C
2290 = 251D 5
2300 = B4A1 9
2310 = 2919 C
2320 = BC74 D
2330 = 3B7B 2
2340 = AFD4 7
2350 = 2C83 D
2360 = AFD4 F
2370 = 2C83 8
2380 = B421 2
2390 = B962 1
2400 = BFA3 8
2410 = BD7A 1
2420 = A8D6 7
2430 = 8F48 C
2440 = C6DF B
2450 = C410 8
2460 = 5E9B E
2470 = AD86 E
2480 = 2C83 B
2490 = 32BA 8
2500 = 2C83 3
2510 = 3E09 D
2520 = 2C83 E
2530 = 81C7 A
2540 = E3B0 E
2550 = ED0F 7
2560 = AAF5 C
```

BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES /BBC A3000 / ARCHIMEDES

Break 147 & Superpool





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FRAME 1
PLAYER 2

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As in the real thing your grip on the butt of the cue (represented by the mouse), the smoothness and power of your cue action and the way in which you follow through with a shot, are all deciding factors in whether a pot is successful and whether you will retain position for the next ball. The only thing that is missing is the smokey air and a pint of beer on the edge of the table, these you will have to provide for yourself!

In both games you can choose to play on a practice table where anything goes. You can position balls wherever you wish so that you can improve your potting and positional play. You can even undo unsuccessful shots so that you can try them again. When you make that incredibly fine clip into a pocket or miss by the merest fraction, you can watch an action replay of the shot from any angle so that you can either gloat or see where you made that tiny mistake that let you down.

When you feel that you are up to the task you can play a single match against a friend or against one of the sixteen computer players. Should you feel lazy you can just sit and watch whilst two computer players battle it out between themselves. Alternatively you can enter a tournament where you will have to fight your way through the preliminary rounds and on to the coveted Final.

Whilst you are playing a match or in a tournament the game will be overseen by the referee. If in snooker you are 'on' a colour as in real life the referee will indicate the ball to you that he thinks you are going for and it is up to you to let him know if he is wrong. The referee will also call when a freeball is to be given, if there is a touching ball and your score after each successful shot.

SPECIFICATIONS

256 colour MODE 13 graphics optimized for maximum speed
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Over 147k of high quality sampled speech and sound effects
Ball plotting accuracy of +-0.05 of an inch on a 12 foot table
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Super
8
pool
Written By Gordon J Key
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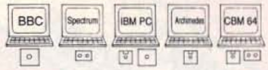

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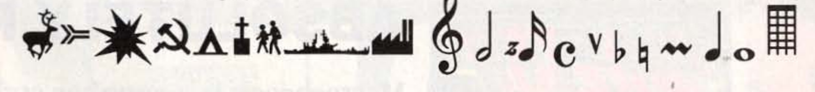

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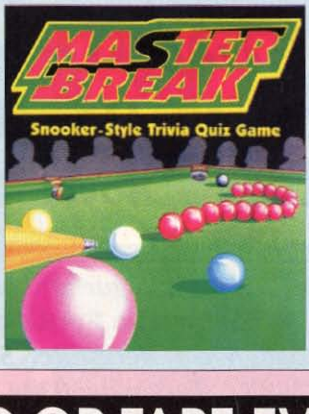
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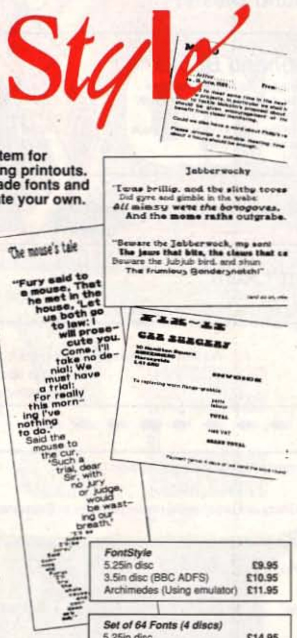

Jabberwocky

'Twas brillig, and the slithy toves
Did gyre and gimble in the wabe:
All mimsy were the borogoves,
And the mome raths outgrabe.

"Beware the Jabberwock, my son!
The jaws that bite, the claws that ca
Beware the Jubjub bird, and shun
The frumious Bandersnatch!"

The mouse's tale

"Fury said to a mouse, That he met in the house, 'Let us both go to law: I will prosecute you. Come, I'll take no denial: We must have a trial: For really this morning I've nothing to do.' Said the mouse to the cur, 'Such a trial, dear Sir, with no jury or judge, would be wasting our breath.'

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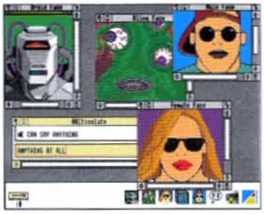

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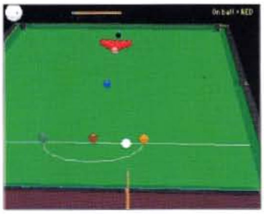

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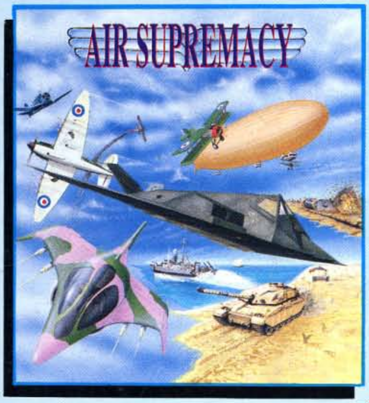

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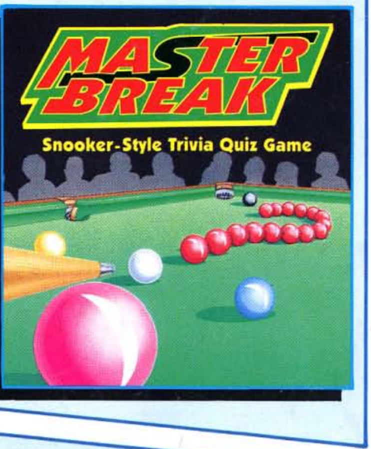

PLAY IT AGAIN SAM 15
NINJA
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